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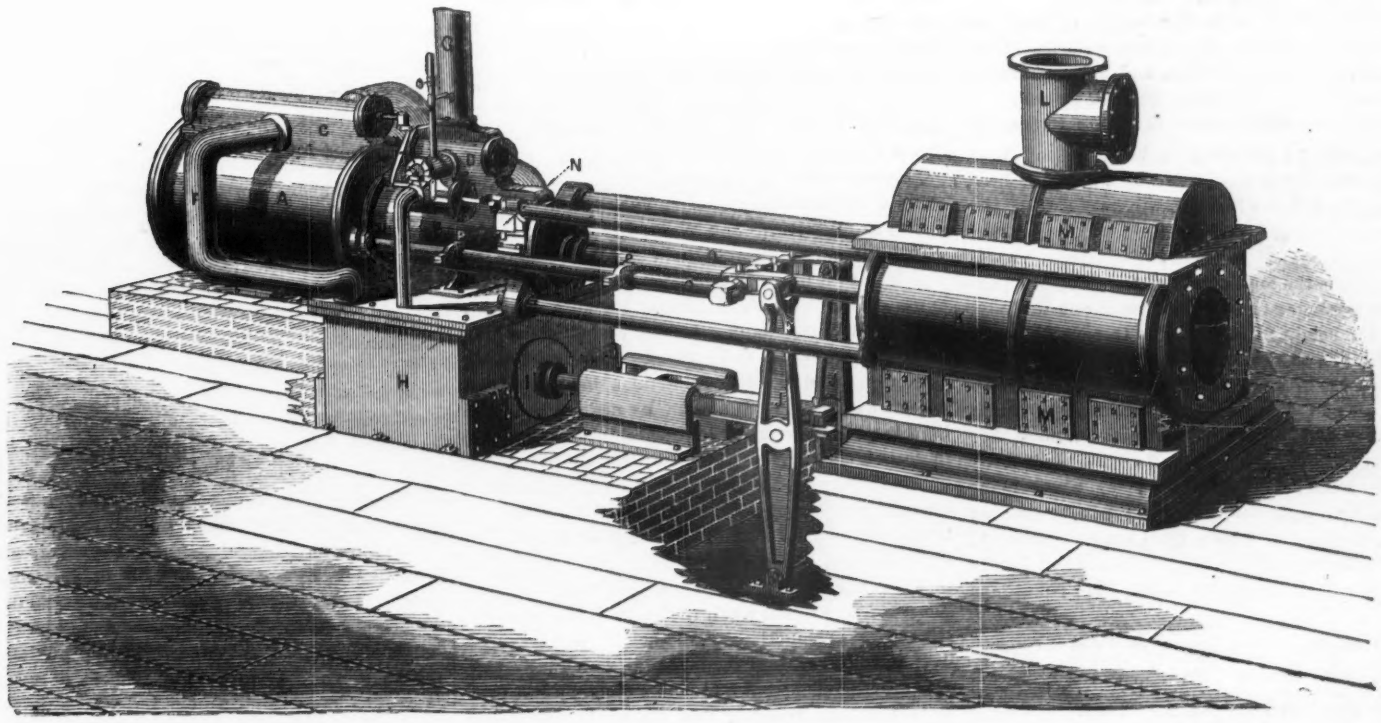
Pump of the Newark Water Works.

Considerable difference of opinion exists among mechanical engineers in regard to the best method of supplying towns with water for domestic, manufacturing and fire service; some maintaining that water should never be pumped into the mains direct, but be first delivered to a reservoir; while others have secured a large amount of patronage by designing water-works without any expensive reservoir, and supplying the water from a force-pump directly into the mains of a city, at a pressure sufficient for ordinary purposes, and in some instances, under sufficient pressure to supply the fire service with water from the hydrants, without any fire engine whatever. The engine illustrated on this page, is designed to result of long experience on the part of the inventors Messrs. BAILEY & BURRITT; one of whom has been for many years engineer of the Jersey City and Newark Water Works. The perfect ease with which their pumps force against high pressures is something marvellous to witness.

Referring to the cut, the pump or water cylinder K with its suction and discharge valves M, appears at the right hand side. The suction pipe is introduced through the foundation, underneath the pump, and the water is delivered to the mains from the top at L. The engine is of the compound style, or with a large steam cylinder A and a smaller one F, into which the steam is first introduced from the boiler, through the pipe G. After being expanded in the smaller cylinder, the steam passes to the large cylinder A, where it acts upon one side of the the piston, (while the connection to the condenser H is open) to the other side. The lever T transmits the motion from the piston rod P, to the air pump I.

A crosshead connects the piston rod of the small cylinder, (P) to the two piston rods O, of the large steam cylinder, one of which passes through a stuffing box at each side in plain sight and where it can can be kept tight and in good order. In many compound engines, an interior stuffing box between the two cylinders is a constant source of loss and annoyance through leakage; as it can only be reached by removing the large piston in cylinder A. The whole arrangement is one of the best for convenience and efficiency.

The pumps built for the Newark Aquaduct, have a capacity of two million gallons per day.



PUMP OF THE NEWARK WATER WORKS.

answer both of these purposes, and is perfectly adapted to force water either into a reservoir, or directly into the mains of a city.

In the former case, simplicity of construction, durability, efficiency and great economy in the use of fuel are the chief requisites.

In the latter, an additional feature is indispensable, viz: absolute freedom from concussion; as any jar whatever in the pump or its valves, is transmitted for miles through the system of pipes, causing annoyance to consumers of the water; gradually, but surely breaking the joint of the pipes in the street; and wearing out the expensive pumping machinery. This quiet action is the pre-eminent characteristic of the pumps built by BOLEN, CRANE & Co., and is the

New Soldering Flux.

M. GAUDUIN has been making experiments to supersede borax, which is generally employed in soldering, and the result is that he finds that an excellent flux for soldering iron, and brazing copper and aluminum bronze, is obtained by a mixture of equal parts of "cryolith" and chloride of barium. Cryolith is a product and export of Greenland, and consists of a double fluoride of aluminum and sodium.

Tunnelling Under the Straits of Gibraltar.

A plan has been submitted to the Spanish Government for a tunnel under the Straits of Gibraltar which may be connected with the shortest route to India. The length to be traversed would be 13,800 meters, while that of the contemplated Dover and Calais tunnel is stated as 32,000 meters.

New Explosive Mixture.

M. VIOLETTE has made the observation that by fusing together a mixture of the nitrate and acetate of soda, a white, hard mass is obtained, which, when heated to 350° C. (662° F.), explodes with violence. By plunging into the liquid mixture a lighted body, an explosion instantly follows.

Steam Hammer Foundations.

By THOMAS GILLOTT.*

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IN the case of the steam hammer, it may be observed, that generally the *vis enertia* of the material operated upon may be neglected; since the weight of the smallest forgings that require the whole force of the hammer, is small, compared with the hammer itself; when, however, it requires to be taken into account, the maximum working fall should be that from which the velocity is derived, and the weight of the smallest forging deducted from the weight of block given by the formula for it. Further, the case of the attached block will be met by considering as "block" the whole mass that receives the impact.

Let W_h = the weight of hammer; V_h = velocity of impact.

Let W_b = weight of block; V = velocity at greatest compression.

Let $\frac{L_b}{K_b} = \frac{\text{length of block}}{\text{area}}$; E = modulus of elasticity of block.

Let $\frac{L_t}{K_t} = \frac{\text{depth of elastic substratum}}{\text{area of base}}$; E_t its modulus of elasticity.

Let P = the greatest driving pressure the substratum is capable of sustaining in addition to the weight of block, etc.

Let g = force of gravity = 32 1-6 feet per second.

Then, atmospheric resistance and friction being neglected,

$$V = \frac{W_h V_h}{W_h + W_b}$$

$$P = \frac{W_h V_h}{W_h + W_b} \left\{ \left(\frac{L_b}{K_b E_b} + \frac{L_t}{K_t E_t} \right) g \right\}^{-\frac{1}{2}} \frac{1}{W_h + W_b}$$

Solving this equation with respect to W_b

$$W_b + \frac{W_h^2 + V_h^2}{P^2} \left\{ \left(\frac{L_b}{K_b E_b} + \frac{L_t}{K_t E_t} \right) g \right\}^{-1} - W_h$$

which is the equation to the weight of the anvil block when the weight of hammer, velocity of impact, greatest driving pressure, and proportions and elasticities of block and substratum are known.

In the single acting hammer the velocity of impact

$V = \sqrt{H\ 2g}$; (H being the height of fall;) but if this velocity is accelerated by a constant force, F, during the fall, the increase will be

$$V_{hi} = \frac{F\ g}{W_h}$$

To illustrate the application of the foregoing principles, let the hammer and block be of cast iron; the ratio of the height divided by the transverse section in feet be ½, and the modulus of elasticity = 7600 tons for a base of 1 square inch. Let the elastic substratum be of oak, capable of sustaining a driving pressure, in addition to the weight of the block, &c., of 50 tons per square foot; the modulus of elasticity being 760 tons per square inch; the whole being supported by a rigid bed of stone, concrete, or other material, the level of which must not be depressed; then the following table will give the sizes of blocks for single acting hammers under the conditions stated:

Weight of Hammer.	Height of Fall.	Velocity of Impact.	Area of Base of Block.	Thickness of Timber under Block.	Weight of Anvil Block.
Tons.	Feet.	Ft. pr sec.	Sq. ft.	Feet.	Tons.
·5	1·5	9·75	12·	1·	1·21
1·	2·	11·38	20·	1·25	2·89
1·5	2·5	12·88	25·	1·5	5·65
2·	3·	13·94	30·	1·5	9·67
2·5	3·25	14·5	35·	1·66′	12·38
3·	3·5	15·1	40·	1·66′	15·8
4·	4·	16·1	50·	1·83′	21·89
5·	4·5	17·1	60·	2·	27·86
6·	5·	18·	70·	2·33′	32·6
8·	5·5	18·8	80·	2·5	48·8
10·	6·	19·7	90·	2·66′	71·4
15·	8·	22·76	100·	3·	182·

For double-acting hammers, let steam be admitted on the upper side of the piston, and act with a pressure of 11·2 lbs. per square inch for the whole stroke, on an area of 100 square inches for every ton weight of the hammer. The velocity will then be increased about 50 per cent. above that of the single-acting hammer; and the blocks for ½, 1, and 1½ ton hammers would require to be 3·35, 7·75, and 14·5 tons respectively. It does not always happen that double action is required for the whole working length of the stroke, therefore the class of work will influence the weight of the block; but when a lighter block is used on this account, more elasticity should be given to the substratum, in case the steam is allowed, by any accident, to act for the full stroke, and thus prevent permanent depression. To take the case of a hammer making boiler plate slabs: the work generally requires the full force of the hammer, while the piece operated upon is comparatively light, and the total fall but slightly diminished; here a block of maximum size is required.

The work accumulated before impact is

$$\frac{W_h V_h^2}{2g}$$

and that expended upon the material operated upon

$$= \frac{W_h + W_b\ V_h^2}{2g\ (W_h + W_b)}$$

therefore the amount of work lost is equal to the difference

$$= \frac{W_h + W_b}{2g} V_2 = \frac{P}{2} \left\{ \frac{L_b}{K_b\ E_b} + \frac{L}{K_t\ E_t} \right\}$$

Suppose that the weight of the anvil block is fixed, and that the substratum has to be sufficiently elastic to prevent permanent depression; the depth of it would have to be

$$L_t = K_t E_t \left\{ \frac{W_h^2\ V_h^2}{P^2 g\ (W_h + W_b)} - \frac{L_b}{K_b\ E_b} \right\}$$

(The last factor within the brackets may be neglected.)

Applying this to the case where a block weighing 3 tons is used for a 20 cwt. double-acting hammer, the pressure of steam, elasticities, &c., being as previously assumed, the oak packing would have to be 3·92 feet thick, in order that the level may be maintained constant when the hammer is not working. Bearing in mind that all work expended after the period of greatest compression is attained, is lost, the necessity of large anvil blocks, where maximum effect is required, will be easily seen.

The form of the block is, to some extent, governed by local considerations. The simplest plan is, no doubt, to cast it in one piece, but there are cases where it is not practicable to do so; nor is there any objection to it being cast in layers, provided that the joints are made to abut firmly, and secured both vertically and horizontally. In any case it is desirable to place large blocks in joggled base plates, so as to conveniently admit of the lateral adjustment often required after being in work. By making the block high in proportion to its horizontal section, slightly increased elasticity is obtained; but the danger of unsteadiness and deviation from the vertical, through unequal yielding of the base, is incurred. Increased lateral dimensions may be obtained by making the block hollow, but generally the space is so limited that it is necessary to adopt the solid form to secure the required weight, when the block is independent; although it is sometimes made hollow, and frequently so in some forms of the blocks to which the standards are attached; but a case of a block on this principle breaking through the center having fallen under the author's notice, confirms the opinion that the mass to receive the impact ought to be concentrated as much as possible immediately under the hammer.

The general conclusions to which the foregoing reasoning has led may be briefly stated:

First. That to secure a perfect foundation, the level at which it commences must be perfectly rigid under the working pressure; and, if not naturally, must be made so.

Second. That (in all but the smallest tilt hammers) the block should be independent of the standards and cylinder.

Third. That the weight of the block should be regulated by the work to be done on it, and the necessary area of base given and quantity of elastic material placed underneath it, to prevent undue pressure on the formation level.

Fourth. That the bed-plates for double standard hammers should be well held together (when not formed by a single casting), and all the work of the best description.

But these conclusions, and what has led to them, are submitted more for criticism than as demonstrated laws; with the hope that their being sifted by practical men—such as compose this Association—may elicit something more true, if not absolute truth.

*Read at the Leeds Association of Foremen Engineers.

The Waste of Fuel.

Figures are perhaps never "dryer" than when they are worked into calculations of heat possible and heat actual; but, on the other hand, they are probably never more useful. Mr. SIEMENS did two very short sums in his address to the British Institution of Mechanical Engineers, but they were both effective. He said that the annual coal production in Great Britain amounts at present 120 million tons, which, if taken at 10s. per ton of coal delivered, represents a money value of 60,000,000*l.* It would not be difficult to prove that in almost all the uses of fuel, whether to the production of force, to the smelting and reheating of iron, steel, copper, and other metals, or to domestic purposes, fully one-half of this enormous consumption might be saved by the general adoption of improved appliances which are within the range of our actual knowledge without entering the domain of purely theoretical speculation, which latter would lead us to the expectation of accomplishing our ends with only one-eighth or one-tenth part of the actual expenditure. To illustrate this he gave two short calculations:

The first related to the possible and the actual consumption of fuel for raising steam. One pound of ordinary coal develops in its combustion 12,000 units of heat, which in their turn represent 12,000x772= 9,264,000 ft. lb., or units of force, which represents a consumption of barely ¼ lb. of coal per indicated horse power per hour, whereas few engines produce the indicated horse power with less than ten times that expenditure, or say 2½ lb. of fuel.

The other deals with the use of coal for heating iron. The heat required to raise a ton of iron to the welding point of say 2,800 deg. Fahrenheit requires 2240x2800x0.13 (specific heat of iron) = 815,360 units of heat, which are producible by 815,360 divided by 12,000=68 lb. of coal, whereas the ordinary heating furnace consumes more than ten times that amount.

Mr. SIEMENS continued: "Taking credit, however, for only 50 per cent. of the actual average expenditure, we arrive at an annual money saving of 30,000,000*l.* per annum—a sum equal to nearly one-half the national income! Nor does this enormous amount of waste indicate all the advantages that might be realised by strict attention to appliances for saving fuel, which are, generally speaking, also appliances for improving the quality of the work produced. In a national point of view it is of great importance that our coal deposits should be made to last as long as possible; and regarding public health and comfort, the smoke nuisance is only another name for waste of fuel, smoke indeed being nothing more or less than unconsumed coal. I am ready to admit, however, that the introduction of all coal-saving appliances involves a considerable expenditure—an expenditure which has to be conducted carefully under the guidance of the mechanical engineer, but which, if properly directed, yields immediate and very ample returns. In reverting to the important branch of the general subject which will be prominently brought before us, we shall find that our best marine engines consume to-day rather less than one-half the amount of fuel which was thought practically indispensable nine years ago, when the same subject was brought before us in holding our general meeting here at Liverpool, showing that one section of our fraternity have at any rate not been idle in the interim. If nine years hence my successor in this chair will be able to announce a similar step in advance we shall have the satisfaction of knowing that our further discussions of the subject will not have resulted in "lost energy."

NOTES ON A METALLURGICAL JOURNEY IN EUROPE.

BY JOHN A. CHURCH, E. M.

The Copper Process at Agordo.

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3. A third improvement suggested is the precipitation of the copper as a sulphide from the cement liquor. To do this, hydrogen sulphide would be made by heating the rich pyrites with sulphuric acid, or passing steam over hot pyrites, the resulting H_2S being dissolved in water contained in a large chamber. The cement liquor would drop into this liquid and the copper be resolved into sulphide which would then be smelted. The objections to this method are the magnitude of the chambers and generators for hydrogen sulphide which would be required to treat about 345,000 cubic feet of cement liquor yearly; the necessity of manipulating the copper sulphide rapidly to prevent its taking fire, and oxidizing to copper oxide which cannot be worked in the furnace without loss, and the difficulty of handling and compressing so large a mass of spungy sulphide. Assuming the yield of 1865 as a basis we have the following estimate of what would be required for this process:

231,000 lbs. copper requires 116,600 lbs. sulphur to make copper sulphide.
116,600 lbs. sulphur requires 220,000 lbs. pyrites to furnish the sulphur.
116,600 lbs. sulphur makes 1,400,000 cubic feet of H_2S gas.
One volume water absorbs 3 volumes H_2S.
Water required, 470,000 cubic feet.
Or 1,513 cubic feet daily for 310 days.

As the amount of cement liquor, in 1869, was only 345,087 cubic feet, the volume of hydrogen sulphide solution would be four times that of the cement liquor. The iron sulphate would no longer crystallize out. Its production would have to be given up or the liquor concentrated again by boiling, which, considering its extreme dilution, would not be profitable. Thus Agordo is considering one proposition to greatly increase its production of copperas and another, which may do away with it altogether.

The circumstances by which the works are surrounded are such that there is no great difference in economy between these two diverse proceedings. The town is situated so far from routes of travel, that the profits on copperas are nearly swallowed up by the freights; so that a very slight improvement in the yield of copper, or in the cost of working it, might determine the sacrifice of the crystallization part of the process. On the other hand the demand for copperas is good; increased make will cheapen processes, and if a great improvement in yield and cost can be obtained by a method which gives more of this article, there will be an advantage in making it. This advantage will be increased by the fact that Signor HUBERT's method gives a fine product.

4. The manufacture of cast or wrought iron from the residues of the lixiviation vats, is another suggestion which was under consideration. These residues, as now produced, would give a cast iron containing about 6 per cent. of sulphur, which, with the present process, would do no harm. By the new method of roasting, the percentage of sulphur would be very much less and would indeed be as low as that of iron made from many good brown hematite ores. As the consumption of iron is about 300 tons a year and it could be made at the works for less than $20 a ton, while it now costs $30, the saving would be considerable. With the new system of roasting there is in fact no reason why good iron, which would readily find a market, should not be made. If wrought iron is made, an open fire will be employed and the unhammered bloom used instead of the pig.

In 1869 the recommendations of Signor PELLATI were confined to the manufacture of bricks, and the erection of a blast furnace to make cast iron. The other proposals were under discussion.

The importance of these changes can be seen at a glance, by comparing the cost of the old and new works. In doing this I will assume that the manufacture of bricks requires the same amount of labor as breaking out the kernels. We would have on the one hand the old process comprising the 7 operations already given, on the other, the new process with 4 operations as follows: Roasting, Lixiviation, Fining and Cementation. There would be a saving upon each ton of ore of about half a day's labor, 13 bushels of charcoal and most of the sandstone. This assumes that the efforts to precipitate in such a way as to obtain finable copper are successful.

The importance to this country of a cheap method for the extraction of copper can hardly be over-stated. There is a vast quantity of 2 and 3 per cent. ore in the United States, lying in deposits that are already known, and scattered through all the States. Cheap and excellent processes are already in use, though not generally so. There are no statistics available for making an exact comparison between the cost by them and by the Agordo method. All that can be pointed out now is the differences inherent in these systems. One works with a very great economy of iron, and the other makes sulphuric acid as a by-product. In efficiency and cheapness they are, so far as I know, very nearly on a par.

The advantage of the Italian method is the extremely low cost of the plant. When the contemplated changes have been made, this expense will be confined to the erection of a few rough roasting sheds, lixiviation vats, and a fining furnace if the amount of ore will warrant it. The outlay for plant which the other systems require, is offset at Agordo by the interest on the cost of mining. This interest, for 9 months, at one per cent. a month would, on ore that cost $2.50 to mine, amount to 23 cents a ton, and on ore that costs $10 to mine, (as it often does in the West) 90 cents a ton. The other expenses by the new method will be abou as follows:

EXPENSE PER TON.

	Labor days.	Wood cords.	Charcoal bushels.	Iron pounds.	Sand pounds.
Making bricks	0·7				
Roasting bricks	0·3	0·003			
Cementation	0·15	0·030		18	
Fining	0·12		2		10
Total	1·27	0·033	2	18	10

To this there would be a small addition for crushing which could be done by a Blake or other coarse crusher.

The copperas which is a by-product of this method, would be valuable only when the mine was so situated as to enjoy cheap and abundant transportation.

It should be noted that this process is applicable to other and more valuable metals than copper. The careful roasting which retains 97 per cent. of the copper in the form of soluble sulphate would be equally effective with nickel and more so with cobalt. These metals or a mixture of them with copper or iron pyrites can be treated by this process and apparently with great success. In fact ores that contain too little of them to be utilizable by ordinary methods, ought to be valuable when brought under this treatment.

The Mercury Works at Valalta. (1)

A FEW miles from Agordo there is a mercury mine, and, connected with it, an establishment for treating the ore which offers some peculiarities well worth considering. This is the mine and works of Valalta. The mercury is obtained from cinnabar found disseminated generally in minute threads and spots through a mass of decomposed porphyry. The rock also contains iron pyrites and gypsum, the latter being usually in contact with the cinnabar when it is concentrated in small veins, as sometimes occurs. Hand specimens of pure cinnabar are found, but they are rare. As at Agordo, this deposit attracts the attention of the metallurgist chiefly on account of its poverty, and the means used to work successfully an ore of so little value.

Three sorts of ore[2] are obtained by hand picking as follows:

Good containing	2·5	per cent. mercury.
Poor "	0·25	" "
Powder "	0·25	" "

In one year 4,910,000 k. or 5,400 tons of ore were mined, and the mercury obtained was 17,000 k. or 18·7 tons which gives an average yield of 0·346 per cent. The loss as ascertained at the works was 0·10 per cent. calculated upon the ton of ore, so that the value of the ore is as follows:

Yield	0·346 per cent.
Loss	0·10 "
Mercury in ore	0·446 "

It has been found that ore containing no more than one-eighth of one per cent. can be worked in this furnace. The methods by which an ore containing only 45-100ths of one per cent. is treated with profit, are as follows:

The works are so situated that the sorted ore is run in cars on a tramway directly from the mine to the top of the furnace, and this work is charged to mining account. At the furnace it is thrown into a wood box, which is so made that it can be lifted up, and which is placed close to a hopper which forms the mouth of the furnace. In the roof of the latter there is a small pipe, with a cover which has a water joint. By looking through this pipe the workman ascertains the condition of the ore in the furnace, and by thrusting an iron rod through it he ascertains the height of the materials. The normal height of the ore is 3·5 meters or 11 ft. 8 in. When it has sunk to this level a new charge is made, provided the surface is red.

The slide of the hopper is withdrawn and the charge already in it falls upon the hot ore. The slide is then closed, the iron plate which covers the hopper, and which also has a water joint, is raised, and the new charge is dumped in by tilting the box. Charcoal, to the amount of 2 per cent. of the ore, is thrown on top and the cover is replaced. The weight of the charge is 480 to 560 k.—1056—1232 lbs.—and a new charge is made usually every hour and a quarter. The daily work of one furnace (24 hours) is therefore 9,120 k. or 10¼ tons.

The furnace is a shaft, and does not differ from the ordinary HÄHNER furnace. The ore rests upon a large grate at the bottom and after each charge the workman pulls down with a hook an equal quantity of spent ore. It falls into an iron wagon, running on a tramway, which is carried under the furnace by means of an arched way.

The peculiarity of this furnace is its condensation. This is by tubes and chambers similar to those employed elsewhere, but the tubes are of wood and the mercurial vapors are drawn through the condensers by suction, an arrangement very important in its results.

It produces perfect draft, so that there is never a return of the vapors to the furnace and out at the furnace bottom, as sometimes happens when the draft is

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1. For the information contained in this paper I am indebted to Signor MANZONI, of Agordo, lessee of the works, and to Signor TOMÉ, manager.

2. A full suite of ores and products of the distillation works can be seen at the New York School of Mines.

vapor. In the 12 years during which this apparatus has been in use, there has been no general sickness, though formerly the hospital, usual to these establishments, had to be maintained and was well patronized. But there are now no cases at the works, except (I believe) one or two which are the result of pure carelessness, or else remain over from old times. Another proof of its efficacy is the revival of vegetation in the immediate neighborhood of the furnace. In former times the lessee had a yearly expense of 30,000 francs in making good the damages by the fumes which escaped from his chimney. He is now entirely freed from this tax.

2. It ensures a constant and regular flow of the vapors from the furnace to the discharge pipe, and thus enables the means of condensation to be properly proportioned to the quantity of fumes, and the rapidity of their discharge.

3. It lowers the tension of the products of combustion in the tubes and chambers a little below that of the atmosphere; the column of gases being somewhat retarded at the furnace end by friction of the air against the ore. For this reason when the traps in the tubes are opened there is no discharge of vapors, but, on the contrary, an entrance of air. The workmen are therefore able to collect the mercury and soot from the tubes without stopping for a moment the run of the furnace. This, together with the following, permits an uninterrupted campaign of two years

4. By keeping the amount of air admitted within regular limits, it prevents the overheating of the furnace. If this takes place the mercury vapors leave the furnace at so high a heat that the usual means of condensation are insufficient and a loss of metal ensues.

It is to the excellent condensation and the two years run of the furnace, that we must attribute the economical results which permit an ore containing only 9 pounds of mercury to the ton of 2000 pounds, to be worked.

The following are the details of construction

Furnace:	Height	6·50	meters.
	Diameter	1·20	"
	Inclination of grate, about	50°	
	Number of grate bars	5	
	Width " "	0·05	meters
	Length " "	1·60	"
	Height of gangway under furnace	2·20	"
	Width	1·30	meters.
Hopper:	Height	1·40	"
	Length of mouth	0·90	"
	Width " "	0·30	"
	Length of slide	2.25	"
Charging box:	Length	1·90	meters.
	Height	0·80	"
	Width	0·80	"
Tubes:	Number to 1 furnace	3	
	Length of iron tubes in masonry	1·40	meters.
	" wood tubes, each section	1·70	"
	Number of sections in each tube	8	
	Diameter of tubes, mean	1·00	meters.
	Whole length of each tube as set up	15·40	"
	Thickness of wood	0·05	"
	Inclination	5°	

Condensation chambers: (The dimensions given are nearly correct.)

Number.	Height.	Width.	Length.
1st	5.50	1·20	3·00
2nd	2·40	1·20	3·00
3d	2·65	2·80	3·40
4th	2·70	2·80	3·40
5th	2·80	2·80	3·40
6th	2·80	2·80	3·40
7th	2·30	1·70	3·00

	Cubical contents, cubic feet	5,082
	Square feet of external surface	2,000
Chimney:	Height from arch of 7th chamber	10·00
	Length of wood pipe	10·20
	Diameter " " at top	0·30
	" " " at bottom	0·25
	Number of upright wood partitions	2

The Furnace is built with thick walls in order to retain the heat. The outer walls are built of slate rock and the lining of large red bricks. Every two years the lining is so worn, from friction of the materials, that repairs are necessary. After the furnace is thoroughly cool, the remains of the old lining are knocked out, from above, and the new bricks are laid with a cement composed of clay, iron filings and acid water from the condensation apparatus. This water contains about 2 per cent. of sulphuric and sulphurous acid. In the outer walls common mortar is used. While making these repairs the workmen are employed only 2 hours a day to avoid sickness from inhaling mercurial dust, as the bricks contain a good deal of the metal. The expense for repairs is, however, slight. After two years, the necessary repairs cost only 150 francs for labor and 50 francs for material; labor being worth about 1—2 francs a day. With very hard bricks which could resist the friction of the ore, there is no reason why the furnace should not have a still longer campaign. The first cost of a double furnace with two shafts, 14 condensation chambers, 6 tubes, and the necessary arrangements for supplying water, is, in Valalta, 20,000 francs. As before said, the furnace with its hopper corresponds in all respects to that invented by HAHNER.

The Condensation Chambers. Those nearest the furnace are lined with a cement similar to that used in building the furnace. It is made of ground scoria 2 parts and lime 1 part. The scoria which is much more serviceable than sand, must contain a good deal of iron, as scorias from puddling or reheating furnaces, copper smelting, etc. That used at Valalta is procured in the copper works at Agordo. Those chambers which are placed beyond the tubes are lined with wood 2 inches thick. This is another peculiarity of these works. The wood not only forms a perfectly tight lining when it has been properly seasoned before use, but it affords cleaner mercury and also more of it during the campaign, from the fact that less metal and soot cling to the smooth wooden surfaces than to a cemented wall. Thus, after the first and second chambers, where the vapors are still too hot to permit the use of a wood lining, the fumes have an uninterrupted course through wood or wood-lined passages. After many experiments with cements, bricks, etc., this material has been found the best.

The Tubes are also of wood, 2 inches thick. They are made in sections, slightly conical so as to fit into each other. Wooden wedges, driven firmly into the joints, make the whole tight. Iron tubes were formerly used; but they made a great deal of trouble, being rapidly eaten by the sulphurous acid vapors, emanating from the pyrites in the ore. They had to be turned every 12 or 18 months and entirely renewed in 2 or 3 years. Iron tubes for one furnace cost 8,000 Austrian florins; wood tubes 2,050 florins. But of this sum the 3 iron rings on each section of wood tubing cost 1,200 florins, and as these remain uninjured, the cost of renewing the wood tubing would be only 850 florins, (about $357). But the saving is even greater than this. Though the wood tubes are kept constantly wet, their durability is much greater than that of iron, and I believe they have been renewed only once in 12 years. A main fault of the iron tubes is that the soot obtained from them is contaminated with iron dust and iron oxides, which makes the separation of the mercury from the soot more difficult, and also introduces a certain amount of iron into the metal. All these advantages—cheapness, durability, and serviceableness—give to wood a great superiority when it can be used. Iron tubes are still used for the sections set in the masonry of the furnace and the chambers, but all other sections are wood. It requires a constant and pretty heavy flow of water, and the wood must be of a kind that endures a condition of moisture as long as possible without rotting. Fir and pine are used at Valalta.

Each tube section is bound with 3 iron rings, driven on to the conical tube. Two trap doors are made in each tube, one in the top and one in the side. Through these openings the workman with a long handled hoe, the blade of which is small, draws the soot and mercury on the bottom of the tube to one place and then removes it with a scoop. During this operation his face is protected by a wet sponge placed over the mouth and nostrils. This precaution should never be neglected, though when the trap is opened the appearance of the tube makes it evident that there is little danger of the escape of vapors. The products of combustion are seen as a bluish gray, dense and moist cloud, moving slowly and regularly through the tube, and there is no escape whatever through the open trap; an accident, which if it occurred, could not escape observation, from the strongly marked color of the fumes. But as the workman has his arm at times partially immersed in this cloud, and his face is therefore brought near it, the necessity of using the sponge, as a matter of precaution, is evident. On the bottom of the tube, mercury soot, and metallic mercury lying in small pools are seen, the bright surface of the metal reflecting the light which enters through the trap, and illuminating the tube immediately around it.

The course of the vapors is as follows: from the furnace to condensation chamber No. 1 which has about the same height as the furnace; from No. 1 to No. 2; from No. 2 through the two lower tubes, each 15 meters long, to Nos. 3, 4, 5 and 6 in succession. These four chambers are so connected that all the fluid mercury collects in No. 4, whence it flows through an iron pipe to a kettle placed in a reservoir outside, fed with running water. Both metallic mercury, and mercury white collect in this kettle. Very little soot, and that very poor, collects in the chambers 1 and 2 next the furnace. Most of it falls in the two lower tubes, together with some mercury. A good deal of the latter flows into chambers 3 and 4, and runs into the kettle above mentioned. With so long a campaign it is necessary to collect as much of the metal produced as possible, while the furnace is still in operation; and the arrangements at Valalta for doing this are very perfect. From chamber No. 6 the vapors pass through the upper tube to No. 7, thence to the 1st partition in the chimney, where they rise to the top, return downwards to the second partition, rise again through the 3d partition and finally leave the furnace by a square wood pipe which, turning downwards, rests upon the side of the chimney, and finally at the level of the tubes, or a little above, opens into a water trompe. This has a fall of 5 or 6 meters discharging its water upon a wooden floor placed under the tubes. This floor, which is carefully made, so as to be water-and mercury-tight, slopes from the furnace to the condensation house, where the water runs off through a trough, which in its turn empties into a cistern, in order that, by arresting the rapidity of the flow, any mercury that may have found its way to the flow may have an opportunity to settle. There are two ways in which the metal may arrive on the floor: 1st. by leaking through the joints of the tubes; 2nd. by escaping condensation in its course through the various passages until it meets the stream of water. But very little does escape, however, only a few drops ever appearing on the floor or in the cistern. I do not know that any thing of importance has been collected from those places.

[TO BE CONTINUED.]

THE COAL TRADE.

NEW YORK, Sept. 6th, 1872.

Anthracite Coal.

Dealers report increased demand, and there is decided activity in some quarters. The usual orders are increased and sometimes doubled, a state of things that comes like a new sensation, after so long a time of rest. There is a general feeling in the trade that matters will soon be better. Some look to the season of the year, others to combinations, to effect a rise of prices, but whatever the reason for the belief is, there ought to be an improvement soon, if we may take the very general expectation of it as the shadow of a coming event. The feeling in the trade is decidedly better, a change that has come within a week, and perhaps arises partly from the evidences of real efforts to make coal pay a profit. The movement in the Schuylkill region considered in this light may have somewhat of the effect it was intended to produce, inoperative as the action of so small a portion of the coal producers must be upon the prices of the trade at a distance.

Taken as a whole, the effect of the extremely low prices which have ruled for so many months, will undoubtedly be beneficial to the trade, by increasing very materially the demand for fuel. At such seasons enterprises are begun which after a start are able to hold their own when an advance comes, but which would never have been started but for the advantage of low prices in beginning. Looking at the history of the most successful commercial country in the world, England, we see an ever recurring alternation of low prices that stimulate demand, and high prices that make the increased production so much the more remunerative. The balance there sways back and forth, now in favor of the consumer and now to the advantage of the producer, and in the end both parties find themselves benefitted by the changes.

Whether the low prices have continued long enough to induce decided expansion of business by consumers, is doubtful, and were it not for one fact, the uncertainty the presidential campaign has introduced into many manufacturing branches, would make us still less confident of permanent enlargement of demand, arising from the low prices. But that fact is the undeniable one, that the demand is really greater than it has been. Our total consumption will this year show a very exceptional increase, even taking into consideration the unusual circumstances of the trade in 1871. We may, therefore, look upon the low prices as positively beneficial to consumption, though we cannot put our hand upon the men who are using more coal than they formerly did.

As for the United States it sees itself in a fair way to benefit very greatly by the concurrence of low prices here with very high prices in England. The obstinate British miner is our best friend, and while we look upon his course with wonder and with some disgust, too, we cannot avoid wishing long life to his perversity. He works for us, and the English are paying him for doing so.

Following the increased activity, coal tonnages have risen somewhat. Some companies have so much to do that they have difficulty in obtaining transportation enough. A good business for the next two months is looked for in most quarters.

The Bituminous trade enjoys the activity which it has had the good fortune to possess, while its sister trade has suffered so much. Prices are about the same and business is good.

Anthracite Coal Trade for 1871 and 1872.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending August 31, 1872, compared with the week ending Sept. 2, 1871.

COMPANIES.	1871. WEEK.	1871. TOTAL.	1872. WEEK.	1872. TOTAL.
*Phila & Reading R. R†	145,202	3,434,978	133,861	3,753,039
Schuylkill Canal	28,052	612,533	27,125	545,758
*Lehigh Valley R. R.	72,697	1,322,573	57,480	2,263,244
Lehigh & Sus. R. R.	35,684	757,238	47,234	1,161,235
Lehigh Canal	11,239	346,204	25,148	484,420
Scranton North	....	251,171	....	455,527
" South	....	579,184	....	1,389,311
Penn. Coal Co., rail	24,292	376,493	27,995	785,552
" " " canal	359	8,067	120	3,714
Del. & Hud. Canal Co.	41,135	551,892	50,268	906,918
" East	9,137	186,177	9,049	409,188
" " West	4,442	60,746	8,108	256,843
" " South	11,579	177,393	9,932	250,133
Shamokin	15,348	431,296	14,982	365,362
Trevorton	....	.....	....	....
Lykens Valley Coal Co.	....	59,047	..	2,085
Wyoming North	....	.....	....	....
Wyoming South	....	.....	....	....
P. N. Y. C. & R. R. Co.	....	104,987	12,047	432,683
Williamstown Col'y	....	.....	....	....
Big Lick Col	....	91,861	....	10,591
Total	394,966	9,351,841	423,349	13,466,608
1870			394,966	9,351,841
Increase			28,383	4,114,767
Decrease				

* These figures are for the week and fiscal period commencing Nov. 30.

† Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1871 and 1872.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending August 31, 1872, compared with week ending Sept. 2, 1871.

COMPANIES.	1871. Week.	1871. Year.	1872. Week.	1872. Year.
C. & O. Canal	21,792	446,441	17,169	420,928
B. & O. R. R.	24,855	829,832	22,544	831,357
H. & B. T. R. R.	3,412	223,719	7,353	200,283
*Harrisburg & D.	11,955	381,213	9,305	340,276
*L. V. R. R.	6,655	269,332	456	20,353
P. & N.Y.C. & R. Co.	....	.....	7,527	256,500
Cumberl'd Branch Canal	5,793	130,713	6,123	143,211
" Railroad	1,024	48,890	469	12,068
Total	75,486	2,330,190	70,946	2,226,976
	70,946	2,224,976		
Decrease	4,540	115,214		
Increase				

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, Aug. 31, 1872.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons.	Cwt.
From St. Clair	32,774	02
" Port Carbon	6,645	02
" Pottsville	3,786	06
" Schuylkill Haven	27,780	15
" Pine Grove	2,891	11
" Tamaqua	15,655	16
" Harrisburg		
" Dauphin	6,810	15
Total	96,344	07

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	10,672	00
" Mill Creek "	2,438	16
" Schuylkill Valley Scales	.....	
" Mt. Carbon "	1,388	13
" Cressona "	8,062	16
" Pine Grove "		
" Tamaqua "	1,121	06
Total	23,686	11

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	1,750	15
" Shamokin	5,260	15
" Herndon	.....	
Total	7,011	10

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	979	04
" Lebanon & Pine Grove Branch	474	10
Total	1,453	14

CONSUMED ON LATERALS.

From Frackville Scales	782	17
" Mill Creek "	526	12
" Schuylkill Valley Scales	853	15
" Mt. Carbon "	1,103	12
" Cressona "	305	19
" Pine Grove "	70	04
" Tamaqua "	260	16
Total	3,803	15

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	176	14
" " Alburtis, " "	.....	
" " Oreland, G. & N. Br.	932	13
" " Connecting R. R.	.....	
" " Willow Street R. R.	452	01
Total	1,561	08

BITUMINOUS.

From Harrisburg	9,284	15
" Connecting R. R., G. & N. Br.		
" Junction R. R.	20	00
Total	9,304	15

COAL FOR COMPANY'S USE.

Anthracite	5,717	09
Bituminous	84	02
Total	5,801	11

RECAPITULATION.

	Total for Week.	Corres-p'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val. Branch	96,344 07	113,213 01	d 16,868 14
For Shipment by Canal	23,686 11	18,323 05	i 5,363 06
Shipped Westward via Northern Central R. R.	7,011 10	5,746 02	i 1,265 08
Shipped West or South from Pine Grove	1,453 14	2,117 16	d 664 02
Consumed on Laterals	3,803 15	3,667 00	i 136 15
Lehigh and Wyoming Coal	1,516 08	2,135 01	d 573 13
Total Anthracite paying freig't	133,861 05	145,202 05	d 11,341 00
Bituminous	9,304 15	11,954 11	d 2,649 16
Total of all kinds paying freig't	143,166 00	157,156 16	d 13,990 16
Coal for Company's use	5,801 11	5,324 16	d 476 15
Total Tonnage for Week	148,967 11	162,481 12	d 13,514 01
Previously this year	4147961 07	3815966 17	i 331,994 16
Total to date	4296928 18	3978448 09	i 318,480 09

SHIPPED BY CANAL.

From Schuylkill Haven	25,489 15	18,532 07	i 6,957 08
" Port Clinton	1,655 00	1,554 00	i 101 00
Total Tonnage per Week	27,124 15	20,086 07	i 7,038 08
Previously this year	518,633 05	597,812 18	d 79,179 13
Total to date	545,758 00	617,899 05	d 72,141 05

Northern Central Railway, Shamokin Division.

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the week ending Aug. 31, 1872.

	Tons.	Cwt.
East	4,001	01
West	10,981	05
	14,982	06
Same time last year	15,348	02
Increase		
Decrease	355	16
Total amount shipped to date	365,362	01
Same time last year	431,296	02
Increase		
Decrease	65,924	01

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending August 31, 1872.

	Week. Tons.	Cwt.	Total. Tons.	Cwt.
Anthracite received:				
From Lehigh Valley R. R.	8,083	14	263,363	08
" Lack. & B. R. R.	1,723	15	56,705	11
" Pleasant Valley R. R.	1,638	01	72,815	10
" Sul. & Erie R. R.	606	09	37,803	14
Total	12,046	19	432,688	03
Distributed:				
To Lehigh Valley R. R.	10	18	30,606	00
To Lack. & B. R. R.			1,017	17
To S. Central R. R.	1,009	18	78,148	01
To Ithaca & A. R. R.	1,087	07	72,449	12
To Erie R. W. Pockets for shipm't.	9,069	17	193,476	08
To individuals on line of road	262	15	14,366	13
To points at & above Coxton for use of Co	285	16	17,710	14
To points between Waverley and Elmira	320	08	24,912	18
Total	12,046	19	432,688	03
Bituminous received from BARCLAY R. R.				
Shipped north from Towanda	7,519	18	254,433	09
Shipped south from Towanda	6	19	1,896	11
Northern Central R R.	.....		170	10
Total	7,526	17	256,500	10
Distributed:				
To Erie Railway	7,065	01	229,266	09
To So. Central R. R.	454	17	24,979	15
To Ithaca Valley R. R.			57	05
Lehigh Valley, R. R.	6	19	1,145	02
To individuals on line of Railroad	....		849	04
To points on line of road for use of Company	.....		202	15
Total	7,526	17	256,500	10
Grand totals transported:				
Anthracite	12,046	19	432,688	03
Bituminous	7,526	17	256,500	10
Total	19,573	16	689,188	13

Lehigh Coal and Navigation Company,

Report of Coal transported over the Lehigh Canal and L. & S. Div of Central Railroad of New Jersey for the week ending Aug. 31, 1872, and for the year 1872.

	WEEK.	YEAR.
Forwarded East of M'ch Chunk by Rail	47,233 15	1,161,235 09
Delivered at and above do., ...	1,057 13	38,981 04
Forwarded East of do., by Canal	25,147 16	484,420 06
	73,439 04	1,684,636 19
Corresponding period last year—		
Forwarded East of M. Chunk by Rail..	35 684 07	757,237 13
Delivered at and above do., ..	1,513 14	38,588 07
Forwarded East of do., by Canal	11,238 16	343,203 1
	48,436 17	1,142,029
Increase on Railroad	11,093 07	401,390
Decrease " "	.....	.....
Increase on Canal	13,909 00	138,216
Decrease " "		
Of the above there was transported on account of—		
Lehigh Coal Nav. Co	26,954 15	586,051 02
Wilkesbarre Coal & Iron Co.	27,950 15	671,274 13
	54,905 10	1,257,325 15
Corresponding period last year—		
Lehigh Coal & Nav. Co	14,790 10	314,594 10
Wilkesbarre Coal & Iron Co.	18,190 10	558,189 08
	32,981 00	872,783 18
Increase	21,924 10	384,541 17
Decrease	.....	

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending August 31, 1872, with totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Wyoming	9,863 16	287,992 01
" Hazleton	44,894 18	1,624,664 12
" Upper Lehigh	90 17	1,950 03
" Beaver Meadow	19,521 06	557,508 15
" Mahanoy	5,369 03	287,563 03
" Mauch Chunk	22 14	2,266 11
Total	79,762 14	2,861,945 05
Same time last year	88,839 14	1,622,617 04
Increase		1,239,328 01
Decrease	9,077 00	
Forwarded East from Mauch Chunk by rail	57,480 07	2,263,244 09
Same time last year	72,696 14	1,322,573 00
Increase		940,671 00
Decrease	15,216 07	

DISTRIBUTED AS FOLLOWS.

Forwarded East from Mauch Chunk by rail	57,101 16	2,228,492 02
do East for use L. V. R. R.	378 11	34,751 18
Delivered at and above Mauch Chunk for use of L. V. R. R.	812 19	43,200 13
To P. & N. Y. R. R.	8,083 14	263,363 08
To N. C. R. R., at Mount Carmel		1,952 05
To D. H. & W. R. R.	1,176 01	20,079 11
To L. & S. R. R. at Packerton for rail	273 12	9,616 09
Delivered at M'h Chunk	50 13	1,293 02
Delivered on line of road above Mauch Chunk	220 15	11,797 06
		4,001 03
To L.S.&R.R., at Penn Hav., for railroad	6,826 03	154,632 14
Do. for canal	4,194 09	79,766 14
To Lehigh Canal Mauch Chunk	644 01	8,997 14
To Catawissa Railroad		
Total	79,762 14	2,861,945 05

Pennsylvania Coal Company.

Shipments of Pittston Coal for the week ending August 31, 1872.

	1872. WEEK.	1872. YEAR.	1871. WEEK.	1871. YEAR.
By Railway	27,994 18	725,552 00	24,291 10	376,493 05
" Canal	120 02	3,713 17	368 10	8,067 05
Total	28,115 00	789,265 17	24,659 00	394,560 10
Increase 1872.	404,705 07			

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending August 31—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1872., tons ct	WEEK 1871., tons ct.	YEAR 1872 tons cwt.	YEAR 1871. tons.cwt.
Wyoming Region	43 03 09	30714 10	982497 07	784012 13
Upper Lehigh Region	4833 04	4203 16	133065 05	43786 06
Beaver Meadow Region				
Hazleton Region	7102 03	4228 03	161284 12	79779 13
Mahanoy Region				
Trenckow Region	5671 07	3720 09	101750 12	80 30 11
Mauch Chunk Region	11608 17	9801 17	295328 13	125488 05
Totals	73109 00	52666 15	1673926 09	1063597 08
Increase	20442 05		610329 01	
Decrease				
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	47233 15	35684 07	1161235 00	757237 13
Forwarded East of Mch Chunk by Canal	18723 06	10124 12	314044 06	192885 10
Delivered at and above Mauch Chunk	1057 13	1513 14	38981 04	38588 07
	355 10	446 03	9950 17	22892 07
L. V. R. R at Packer'n				
Delivered to L. & B. R. R.at Plymouth Bridge	6738 16	4897 19	149714 13	51993 11
Totals				
Of the above there was transported on acc'nt of L. C. & N. Co	19003 09	12832 10	426350 08	173971 01
W.-B. C. & I. Co	27950 15	18190 10	671274 13	588189 08
Totals	46954 04	31023 00	1097625 01	732160 09
Increase	15931 04		365464 12	
Decrease				

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday August 31. and during the year 1872, compared with the corresponding period of 1871.

WEEK.

	To C.& O. Canal Tons. Cwt.	To B.&O. R.R. C. Tons. Cwt	Total. Tons Cwt.
1872	17,168 12	22,541 00	39,712 12
1871	21,792 03	24,854 17	46,647 00
Increase			
Decrease	4 623 11	2,310 17	6,934 08

YEAR.

1872	420,928 02	831,357 05	1.252,285 07
1871	446,441 10	829,8 2 02	1,276,323 12
Increase		1,475 03	
Decrease	25,513 08		24,038 05

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To P.&O.R.R. Co Tons Cwt.	Total. Tons. Cwt.
1872	6 123 02	469 01	6,592 03
1871	5,792 12	1,024 04	6,816 16
Increase	330 10		
Decrease		555 03	224 13

YEAR.

1872	143,211 00	12,067 17	155.278 17
1871	130,713 06	48,8?9 11	179,602 17
Increase	12,479 14		
Decrease		36,821 14	24,324 00

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending Aug. 31, 1872.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	50,268	906,918
By Railroad, East	9,049	400,188
" " West	8,108	256 843
" " South	9,932	250,133
Total Tons	77,357	1,814,082

For the same period last year.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	41,135	551,892
By Railroad, East,	9,137	186.177
" " West	4,442	60,746
" " South	11,379	177,393
Total Tons	66,093	976,208
Increase	837,874	

Lehigh Canal Coal Trade.

Shipped for the week ending August 30, 1872.

	Week. Tons. Cwt.	Week. Tons. Cwt.
Total from Mauch Chunk Region	7,951 06	159,700 14
" " Beaver Meadow "	5,614 17	99,030 09
" " Mahanoy "	.....	7,579 12
" " Hazleton "	6,826 03	154,166 07
" " Upper Lehigh "	1,031 03	18,696 12
" " Wyoming "	3,724 07	45,247 01
Total	25,147 16	484,420 06
Corresponding week last year	11,218 16	346,203 15
Increase	13,909 00	138,216 11
Decrease	.....	

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, August 31, 1872.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	56,853 15	1,713,209 18
Shipped South	9,932 07	250,132 18
Total	66,786 02	1,963,342 16
For the Corresponding time last Year :		
Shipped North	61,304 16	782,821 17
Shipped South	11,3?9 01	177,393 05
Total	72,683 17	960,215 02
Increase		1003,127 14
Decrease	5,897 15	

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, August 31, 1872.

	Tons. Cwt.
From Schuylkill Haven	25,489 15
" Port Clinton	1,655 00
Total for week	27,124 15
Previously this year	518,633 05
Total	545,758 00
To same time last year	612,533 08

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

SCHUYLKILL.	AT NEW YORK. September 6. R. A.	W. A.	AT PHILADELPHIA September 6. R. A.	W. A.
Lump	$— —	$— —	— —	
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	
Egg	5 25	4 75	— —	— —
Stove	5 50	5 00	— —	— —
Chestnut	4 25	— —	— —	
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	5 35	——	— —	— —
Broken	4 60	— —	— —	— —
Egg	4 60	— —	— —	— —
Stove	4 85	— —	— —	— —
Chestnut	4 35	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS				
Honey Brook, Le'h W.A.	4 00@5 00		— —	— —
Spring Mountain " "	—@—		— —	— —
Sugar Creek	—@—		— —	— —
Sugar Loaf	—@—		— —	— —
Old Comp'y's	4 00@5 15		— —	— —
Room Run	4 00@4 50		— —	— —
McNeal			— —	— —
Girardville			— —	— —
Hill & Harris			3 10@4 00	— —
Shamokin			— —	— —
Lykens Valley			— —	— —
Broad Top			— —	— —
McMichael			3 25@4 25	— —
Henry Clay			— —	— —
Powelton			— —	— —

Company Coals.

September, 1872.

	L.	Str.	Gra	Eg.	Sto	Chest
*Scranton at E. Port	3 45	3 45	3 65	3 70	4 00	3 50
*Pittston at Newburg	3 80	3 80	3 80	3 80	4 00	3 80
*Lackawana at Weehawken	3 50	3 50	3 50	3 70	4 00	3 60
Wilk'b're at Hoboken	3 60	3 65	3 85	3 85	4 10	3 60
Old Co. Lehigh at Pt.John'n	5 25	—	4 50	4 50	4 60	4 00
Lehigh at Eliz. Port	5 00	—	4 25	4 25	4 50	4 00

For freights to different points see "Freights."
To contractors only.

Prices at Baltimore—September, 1872.

Wholesale Prices to Trade

Wilksbarre, by cargo or car load	$4 60@4 85
Pittston and Plymouth, do	4 60
Shamokin Red or White Ash, do	4 75
Lykens Valley Red Ash, do	5 50
Zerba Valley	
Treverton	
By retail, all kinds per ton of 2,240 lbs	6 50@7 50
George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 60@4 65
Fairmont and Clarksburg gas f. o. b. at L. Point	6 00
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phoenix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Consolidation Coal Co.'s on board N. Y.	
Maryland Coal Co "	

Prices at Georgetown, D.C., and Alexandria, Va.

September, 1872.

George's Creek and Cumberland f. o. b. for shipping $4 25@4 35

Prices at Havre de Grace, Md.

September, 1872.

Wilkesbarre and other White Ash for Cargoes	$4 25@4 50
Lykens Valley	@5 50
Shamokin Red or White Ash	4 25@4 50

Bituminous Coals (Cumberland).

Georgetown, F.o.b	$4.25
Baltimore	4.50
New York	6.60

Prices of Gas Coals.

September, 1872.
PROVINCIAL.
Corrected weekly by Louis J. Beiloni, Jr., 41-43 Pine st., N.Y

	Coarse	Slack.
Block House	$1 60	$— 75
Gowrie	1 60	— 75

Vessels are being chartered at $3 00 to $3 25.
Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	1 25
Sydney	2 25	- 80
Lingan	1 60	- 80
Caledonia	1 60	- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm : 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale : 75 cents per ton of 28 bushels.
AMERICAN.

	Currency.
Westmoreland	$7 10 @— —
Fairmount Gas Coal Co. of N. Y.	7 00 @— —
Despard Coal Co	7 00 @— —
Penn	7 10 @— —
Newburg Orrel Gas	— — @— —
West Fairmount Gas Coal	7 00 @— —
AT PHILADELPHIA.	
Westmoreland	6 00 @— —

Prices of Foreign Coals.

September, 1872.
Duty 75 c. per ton.
Corrected weekly by ALFRED FARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	12 00@13 00
" House "	19 00@20 00
" Orrel	14 00@16 00

Per ton 2,240 lbs., ex-ship.
PRICES FROM YARD.

Liverpool House Orrel, screened	$14 00@16 00
"Cannel, "	19 00@23 00

Per ton 2.000 lbs. delivered.

Rates of Transportation to Tide Water.

BY RAILROAD.
TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption ($1 85 less 55c drawback	$1 30
For reshipment	1 75

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 66
C. R. R., N. J., Phillipsburgh to Elizabethport	0 98
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$1 9

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R. R. from M. C. to Phillipsb'g	$0 66
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO HOBOKEN

L. V. R. R., Mauch Chunk to Phillipsburgh	66
Morris & Essex R. R. Phillipsburgh to Hoboken	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO SOUTH AMBOY.

L. V. R. R.	66
B. & D. R. R.	93
Cam. & Am. R. R.	
Shipping Expenses	3?
Total	$ 199

PENN HAVEN TO ELIZABETHPORT.

L. V. & R. Penn Haven to Phillipsburgh	0 7
C. RR. of N. J. Phillipsburgh to Elizabethport	0 98
Shipping expenses	25
Wharfage	10
Total	$2 11

Freights.—September, 1872.

TO EASTERN PORTS.	Cumberland. From Georgetown.	From Baltimore	Anthracite. From Philadel'a.	From Elis. Port, Port Johnson, and Hoboken.	From Newburgh.	From Rondout.
Amesbury						
Bangor		2 80		1 75	2 00	
Bath		2 90				
Boston	2 75	2 75		1 75	2 00	
Bridgeport	2 30	2 30		1 00	1 15	
Bristol	2 40			1 40	1 60	
Cohasset Nar'ows	2 75					
Derby	2 75			1 25	1 35	
Dighton	2 50					
East Cambridge				1 75	2 00	
Fall River	2 40	2 50		1 40	1 60	
Hackensack						
Hartford	2 85	3 00		1 60	1 80	
Hoboken	2 00			50	60	
Jersey City	2 00			50	60	
Lynn					2 00	
Middletown				1 25	1 35	
Mystic	2 60	2 75		1 25	1 35	
New Bedford	2 50	2 75		1 45	1 65	
Newburyport	2 85	2 90		1 90	2 10	
New Haven	2 30	2 30		1 00	1 15	
New London		2 55		1 20	1 35	
Newport	2 40	1 90		1 40	1 60	
New York	2 10	1 9		50	60	
Norwalk	2 50	2 50		1 00	1 15	
Norwich	2 3	2 50		1 30	1 45	
Pawtucket	2 85	2 65		1 50	1 70	
Portland	2 75	2 75		1 75	2 00	
Portsmouth, N.H	2 90	2 90		1 85	2 10	
Providence	2 40	2 40		1 40	1 60	
Rockport						
Saco						
Sag Harbor	2 85	3 00		1 20	1 40	
Salem	2 75	2 75		1 75	2 00	
Stamford				1 00	1 05	
Stonington				1 25	1 35	
Taunton				1 90	2 10	
Warren				1 40	1 60	
TO RIVER PORTS						
Albany	3 00					
Catskill						
Cocksackie						
Coeyman's						
Cold Spring	2 30	2 25				
Fishkill						
Haverstraw	2					
Hudson	2 30	2 50				
New York						
Nyack	2 25					
Poughkeepsie	2 50					
Rhinebeck						
Rondout						
Saugerties						
Sing Sing						
Stuyvesant						
Tarrytown						
Troy	3 00					
West Point						
Yonkers						

Foreign and Provincial Freights.

September 1872.

Foreign.
Newcastle and Ports on Tyne, per keel of 21 1-5 tons £
Liverpool, 5 per cent primage

TO NEW YORK.

Provincial

Sydney	$3
Lingan	3
Cow Bay	3
Port Caledonia	
Little Glace Bay	

TO BOSTON.

Sydney	3
Lingan	
Cow Bay	
Port Caledonia	
Little Glace Bay	

MARKET REVIEW.

NEW YORK, Sept. 4, 1872.

IRON.—The best brands of Scotch Pig are held with increased firmness. Later advices by cable report a further advance on the other side, of Gartsherrie to 160s. and Eglinton to 140s., which has the tendency to stiffen prices here, and to make holders less inclined than ever to accept present ruling rates. We quote the market firm at $51a51.50 for Eglinton, and $54.50a55 for Glengarnock. The present stock of Coltness is held above present rates. We note sales 100 tons Eglinton, 200 do. Govan, and 200 do. Monckland, on terms not made public, the latter at full figures. American continues very

firm, and any obtainable lots are quickly disposed of at very full rates; some No. 1 Lehigh, the quantity we did not learn, sold at $56; 200 tons No. 1 Poughkeepsie, $54; and 200 do. White Forge, $42.50 laid down here. Rails are quiet at $75 for New English, and $49a51 for Old; both gold, without sales. New American are quiet at $85a90 currency at the mills at Pennsylvania. Scrap is very dull and irregular, with sales of 1000a1500 tons, in lots, at prices ranging from $45 cash to $50 time, though we understand that $48 is now the lowest at which any can be had; we quote ex ship $48a50, and from yard $50a 52.50. Refined Bar continues very firm at the last advance, with fair stocks and good demand. Russian Sheet is in moderate request within our range. Common Sheets are very strong.

PHILADELPHIA, Sept, 2.—(From Circular of Edward Samuel.)—Pig Iron is still firm at quoted figures, with little offering for sale, all the best brands being out of the market. Closing prices for American No. 1 Foundry Pig, at Furnace, $52a53; No. 2 $49a51; No. 3 Forge $47a48; and No. 4 White and Mottled, $42a44; and Refined Bar (Mill price) 5 cents.

IRON AND STEEL PRODUCTION.—The whole production of Anthracite Pig Iron in the United States in 1871 was 957,608 tons, an increase of three per cent. over the product of the preceeding year. The product of the raw bituminous coal, coke and charcoal furnaces cannot be given accurately, but the estimate is 955,000 tons, making the entire Pig Iron product for 1871 1,912,608 tons against 1,865,000 tons in 1870, and 1,916,000 tons in 1869. The utmost present annual capacity of the blast furnaces of the country is 2,500,000 tons. The total production of Rails last year amounted to 775,753 tons against 620,000 tons in 1870 and 593,586 tons in 1869, and of rolled and hammered Iron, other than Rails, 700,000 tons. The product of Steel of all kinds is estimated at 82,000 tons, of which 45,000 tons were made by the Bessemer process. The declared dutiable value of Iron and manufactures thereof, imported in the year ending June 30, 1871, was $31,852,034.83, and of Steel and manufactures thereof, $11,404,084.85; total, $42,256,119.68. there are forty-eight Rail mills in the country, and their utmost annual capacity is placed at about 1,000,000 tons. Of the production of Rails, Pennsylvania is credited with 335,604 tons, Illinois, 91,178, New York, 87,022, Ohio, 75,782, Maryland, 44,041, Wisconsin, 28,864, and nine other States with from 6,000 to 14,000 tons each.

COPPER.—Manufactured is unchanged. We noticed a firm market for Ingot with a reduced stock and probable moderate supplies for the remainder of the season. Some 250,000 lbs. Lake were forced off last week at 35¼ cents, but since then 230,000 lbs. have been sold at 33½, the present market rate. For September, October and November delivery.

LEAD.—Pig is without movement or change. Bar 9¼ cents, Sheet and Pipe 11, and Tin-lined Pipe 15½, all less 10 per cent to the Trade.

SPELTER.—The market is dull, but without change in price—85 tons Silesian sold at 6¾ cents gold, and 50 do., on private terms.

TIN.—Pig continues without life—we quote Straits 33½ cents, with sales of 100a150 pigs in lots at this price; English 33¼a33½ (sales 5 tons on private terms) and Banca 41, all gold. A cable telegram received yesterday quotes Straits £148 10s., and English £151. Plates are quiet and prices rather favor buyers—200 bxs, Charcoal Terne, sold at $11,50, and 250 do. I. C. Coke Tin, 14x20, $12 gold.

ZINC—Sheet is dull, and we have no sales from agents' hands to note—25 csks. Mosselmann sold by a dealer on private terms. Am. Dry is quoted at from 8¾ to 9, French 9a9¼, Metallic 10½a11, Manganese oxide 4½a5.

METALS.

NEW YORK, September 4, 1872.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, $7 ℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ℔ ton	— —@— —
Gartsherrie	55 00@56 00
Glengarnock	54 50@55 00
Eglinton	51 00@52 50
Pig, American, No. 1	54 00@57 00
Pig, American, No. 2	52 00@53 00
Pig, American, Forge	48 00@49 00
Bar Refined, English and American	115 00@120 00
Bar Swedes, assorted sizes (gold	120 00@130 00

	Store Prices, Cash.
Bar, Swedes, 1⅜ to 5 x ⅜ & ⅞ 2 sq. & 6 to 12 x ⅜ & ¼	145 00@155 00
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ½ to 1 in.	— —@120 00
Bar, Refined, 1¼ to 6 by ¼	125 00@— —
Bar, Refined, 2¾ to 2⅞ round 1 & 1¼ by ¼ & 5:16	127 50@— —
Large Rounds	127 50@140 00
Scroll	140 00@170 00
Ovals and half-round	140 00@160 00
Band	— —@135 00
Horse Shoe	130 00@140 00
Rods, ¾ to 3-16 inch	125 00@165 00
Hoop	145 00@190 00
Nailrod	— —@— —
Sheet, Russia, as to assortment (gold)	17½@ 18
Sheet, Singles, D. and T. Common	—7 @— 8½
Sheet, D. and T. Charcoal	—7¾@— 8½
Sheet, Galv'd, list 10 per cent discount	—@— —
Rails, English (gold), ℔ ton	75 00@— —
Rails, American, at Works in Pennsylvania, currency	85 00@ 90 00

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	— @— 43
Copper Bolts	— @— 45
Copper Braziers, 16oz. and over	— @— 45
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	26 @— 28
Copper, Old, for chemical purposes, 14@16 oz	— @— —
Copper English Pig	— @— 33
Copper, American Ingot	33½@— —
Yellow Metal, New Sheathing & Bronze	— @— 30
Yellow Metal Bolts	— @— 32
Yellow Metal Nails	30 @— 32

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 11¼ cents ℔ lb; Pipe and Sheet, 2¼ cents ℔ lb.

Galena, ℔ 100 lbs	$— — @— —
Spanish (gold)	— — @6 50
German, do.	— — @6 50
English do.	6 75 @7 12½
Bar (net)	9 25 @— —
Pipe (net)	— — @11 00
Sheet	— — @11 00

Colwell, Shaw & Willard Tin-Lined Lead Pipe 15 cts. ℔ lb.

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. Store prices.

English Cast (2d and 1st quality) ℔ lb	— 16¼@— 20
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 11½@— 16
English Machinery	— 11½@— 13¼
English German (2d and 1st quality)	— 11½@— 12
American Blister "Black Diamond"	— — @— 11½
American, Cast, Tool do.	— — @— 17
American, Spring, do.	— — @— 11
American Machinery do.	— — @— 11¼
American German, do.	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	41 @—
Straits	33½@—
English	33 @33½

PLATES.	Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box		$13 37½@13 50	$15 25 @15 75
I.C. Coke		12 00 @12 50	14 25 @15 00
Coke Terne		11 00 @11 25	12 50 @13 00
Charcoal Terne		11 50 @12 00	13 50 @14 00

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	6 75 @ 7 00
Plates, Domestic p. lb.	— 8 @— 11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2¼c. per lb

Sheet per lb.— 10 ¼@ 11

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The dues for the year ending May, 1873, are now payable. All members and Associates who have not paid their dues are requested to do so at once, by sending in postal orders, or checks, or money, ten dollars to the Secretary.

All members and Associates who pay their dues for each current year, strictly in advance, will have sent to their address, regularly and weekly, the ENGINEERING AND MINING JOURNAL, which is the organ of the Institute, and will contain the proceedings and transactions, and all important papers read before the Institute and all notices of meetings. Back numbers cannot, as a general rule, be sent.

II. It is expected that the more important papers read before the Institute, and the debates thereon, will be published in annual or occasional volumes to which those Members and Associates will be entitled who have paid their dues.

III. All authors of papers are requested to notify the Secretary in advance of the meetings, giving the subject and length of their papers. Attention is also called, in this connection, to Rules 12 and 13.

IV. The ninth rule has been amended, so that there will be hereafter three meetings a year, in February, May and October. The meeting next October will be held at Pittsburgh, Pa.

MARTIN CORYELL, Secretary.

Wilkesbarre, Pa.

BOARD OF ENGINEERS OF THE FOURTH AVENUE IMPROVEMENT,
OFFICE, GRAND CENTRAL DEPOT,
NEW YORK, September 5, 1872.

NOTICE TO CONTRACTORS.

Sealed proposals will be received by the undersigned, at this office, until 2 o'clock of the 30th day of September, 1872, for all the work on the Fourth Avenue Improvement between 79th street and Harlem River, embracing a large amount of heavy work, Excavation, Tunnels, Walls, Bridges, &c.

Plans and specifications, and blank proposals, will be in readiness at this office on the eleventh day of September, on and after which time the Engineers will be present to make explanations.

ALLAN CAMPBELL,
ALFRED W. CRAVEN,
EDWARD H. TRACY,
J. C. BUCKHOUT,
Board of Engineers 4th Avenue Improvement.

COAL SHIPPERS.

R. R. HEFFORD & CO.,

Forwarders and Dealers in
ANTHRACITE, CANNEL, BITUMINOUS AND BLOSSBURG

COALS,

OFFICE, No. 2 MAIN STREET AND No. 1 CENTRAL WHARF,
Docks opposite foot of Main Street,
BUFFALO, N. Y.

R. R. HEFFORD. JAMES KELLY.

Railroad Iron, Iron Ore and other heavy Freights Docked and Forwarded. april 9:3m

CUMBERLAND COAL,

MINED BY THE
CONSOLIDATION COAL COMPANY,

Of the best quality for manufacturing, steam generating, domestic purposes.

Orders received by the Cargo at
New York Office, 71 Broadway.
New England Agency,
STEVENSON & PIERSON,
48 Kilby street, Boston.
Baltimore and Georgetown Agency,
G. MEREDITH, South Gay street,
mch7;tf Baltimore.

THE NEWBURGH ORREL COAL COMPANY

Mines at Newburgh, Preston Co., W. Va.
Company's Office, No. 52 S. Gay St. Baltimore, Md.
C. OLIVER O'DONNELL.....President.
CHAS. MACKALL.....Secretary

This Company offer their very superior Gas Coal at lowes market prices.

It yields 10,996 cubic feet of gas to the ton of 2,240 lbs. of good illuminating power, and of remarkable purity; one bushel of lime purifying 6,792 cubic feet, with a large amount of coke of good quality.

It has been for many years very extensively used by various Gas Companies in the United States, and we beg to refer to the Manhattan, Metropolitan, and New York Gas Light Companies of New York, the Brooklyn and Citizens' Gas Light Companies of Brooklyn, N. Y., the Baltimore Gas Light Company of Baltimore, Md., and Providence Gas Light Company, Providence, R. I.

The best dry coals shipped, and the promptest attention given to orders. sep21-1v

THE DESPARD COAL COMPANY OFFER THEIR Superior DESPARD COAL to Gas Light Companies throughout the country.

MINES IN HARRISON COUNTY, West Virginia.
Wharves, Locust Point,
Company's Office, No. 29 South st. } Baltimore.
AGENTS:
PARMELEE BROTHERS, No. 32 Pine street, New York. BANGS & HORTON, No. 31 Doane street, Boston.

Among the consumers of Despard Coal we name Manhattan Gas Light Co., New York; Metropolitan Gas Light Co., New York; Jersey City Gas Light Co., Jersey City, N. J.; Washington Gas Light Co., Washington, D. C. Portland Gas Light Co., Portland, Maine.

☞ Reference to them is requested. may30-1y

COXE BRO.'S & CO., CROSS CREEK COLLIERY, MINers and Shippers of the Celebrated

Cross Creek Free Burning Lehigh Red Ash
COAL.

FROM THE BUCK MOUNTAIN VEIN.
OFFICES:
Philadelphia, No. 206 South Fourth street.
Drifton, Jeddo P. O., Luzerne Co., Pa.
Agent in New York, SAMUEL BONNELL, Jr.,
Room 43, Trinity Building,
feb-1 111 Broadway.

DETMOLD & COX,

ANTHRACITE AND BITUMINOUS
COALS.

Office, 40 Trinity Building, New York. jan 28-1

STEPHEN S. LEE & SON,

Miners and Shippers of
GEORGE'S CREEK COAL
SWANTON MINES,

No. 49 West Lombard street,
may28-tf BALTIMORE.

MARYLAND COAL CO.,

Miners and Shippers of the best George's Creek Cumberland Coal.

Office No. 12 Trinity Building.
W. W. BRAMHALL, Secretary & Treasurer.
A. CHAMBERLIN, President.
an23.1y JOHN K. SHAW, Vice President.

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THE NATIONAL OIL JOURNAL,
Pittsburgh, Pa.
Price, $1.00 per year. April 23:tf

Rolling Iron by Three-High Rolls.

*On Lauth's System of Rolling Iron by Three-High Rolls.**

By Mr. Lauth, Pittsburg, United States.

THIS system, MR. LAUTH stated, had been very generally adopted in the United States for all classes of iron, whether for puddled bars, rails, or plates, and it was, he considered, the one best adapted for turning out quantity in a given time, and for lessening breakages, by easing the strain upon the different parts of the machinery. It also reduced the labor to the workmen. In MR. LAUTH'S machine the middle roll is fixed, and the top and the bottom rolls move towards or from the middle roll by means of double screws—one at the top of the standard and the other at the bottom—these screws being coupled so that the top and bottom rolls move simultaneously. There were, the writer said, in the United States 23 mills running three-high rolls, and the character of these was as follows: The hard rolls were of the usual size, but between them there was a roll of smaller diameter: thus for a 4-ft. roll of 20 in. diameter the small roll would be 13 in. diameter; for a roll 6 ft. long by 22 in. diameter the middle roll would be 16 in. diameter. The bottom roll only was driven, the hard rolls, both the middle and top rolls, running by friction. The rolls were all turned perfectly straight and level. A stream of water was constantly kept upon the roll to keep it perfectly cool. The effect of this was that there was no expansion or contraction of the rolls, and the sheet or plate was rolled to a perfect level. The writer had found prejudice running so strong amongst English manufacturers that until recently he had been utterly unable to make any headway with his invention. A number of firms had, however, adopted it of late, and Mr. Jones, of Middlesbrough, could testify that there was no difficulty in working four furnaces in place of two by the old system, and his would turn out from 15 to 20 tons of 16 wire-gauge sheets in 12 hours. The ease with which the men worked, and the freedom from exposure to the heated rolls, was much appreciated by them. There was no labor involved beyond pushing the pieces in between the rolls, and the energies of the men were not exhausted by severe labor as at present.

MR. MENELAUS said it would not be convenient in this country to roll with three-high rolls for several reasons. The first was that it would entail on makers the necessity of keeping a very much larger stock of rolls than they now had. One element of expense was the immense stock of rolls that English manufacturers had to keep to suit the tastes and opinions of the various engineers. They had three sections of rails—the double head, the flange, and the bridge—and each engineer had his own form. There was an unlimited number of sections made in England, and when to that was added the foreign trade, the number of rolls became enormous. At Dowlais, with the present system, he had an acre of rolls, and he would not like to have an acre and a half. The multiplicity of sections ran the makers into comparatively small orders, and they had for that reason to change the rolls five or six times a week, and it was easier to change two rolls than to change three. Another reason was that the engineers—except, perhaps, those of America—were very particular about the sections. In America they had few sections, and makers sometimes received orders to enable the rolls to go for nearly a month without changing and so long as these makers could produce anything like a roll approaching the form of the section sought, the engineers were content to take it, and the iron manufacturers did not trouble themselves much about the sections. Taking into account the stock of rolls that English makers required to keep, and the time required to change them, owing to the accuracy of section required by the engineers, he was of opinion that the two-high roll system was the most economical.

MR. SNELUS, West Cumberland (one of the Danks Commissioners), said that he saw the three-high rolls at work in America, and for the purpose of rolling plates they were admirably suited—the parallelism of the surfaces was good, and the work was done with great ease.

MR. DANKS said he had been making rails for the last twenty-four years, and during ten years he had used the three-high rolls, and it would now be difficult to convert him to any other method. In regard to the American engineers not being so particular about the sections, he only wished MR. MENELAUS to give them a trial.

MR. SNELUS said that when in America, he paid particular attention to the sections of the rails, and on very many occasions it could be easily seen by the eye that the sections on both sides of the mid-central line were different; but when he came to measure them the difference was unmistakable. That result was due to the bottom roll being fixed and the two top rolls movable. He believed a mill was being erected near Bethlehem where the middle roll was to be fixed, and by that means the sections on each side of the mid-central line would be the same. In a trip which he had just made through Germany, where the bottom roll was fixed and the top rolls movable, he found that the sections were not true; but there were some mills at work where the middle roll was fixed, and the top and bottom rolls were movable, and in these cases the sections were just as good as in the English rails.

MR. WILLIAMS said he had been making rails for thirty years, and during that time he had had sections innumerable. As regarded the sections of the American rails, it said very much for the good sense of the American engineers. With a young engineer from the technical schools of Germany, or from any of the engineers' offices in Great George street, Westminster, who required mathematical accuracy, it was sometimes not easy to deal; and to obtain that with the three-high roll mill would have been utterly impossible. With any mill of that sort, with the bottom roll fixed and the two above movable, it could not be done; but with the middle roll fixed, and the top and bottom rolls movable, the thing might be possible. There were other difficulties, which would at once occur to a practical railmaker; but these might be successfully surmounted. The great reason why the English railmakers stuck to the two high rolls was that it was found to be, on the whole, the most economical. He thought the time would soon come when they would be able to roll rails in very great lengths, and then a three-high roll, or even a four-high roll mill would be a necessity—one set of two rolls going one way, and another set of two going the reverse way. In old times it was necessary to finish the rail at a particular heat, and rolling in great lengths was difficult, and caused great waste; but MR. BESSEMER had taught them to make metal for rails at any heat and almost any length; and he did not at all see why BESSEMER rails should not be rolled 100 ft. long, and cut off in such lengths as were wanted. He was inclined to think that, for making sheets and plates, this system, which he had seen at Newport (Middlesbrough), would be uncommonly good, and he heartily wished it success,

The chairman, in moving that a hearty vote of thanks be awarded to Mr. LAUTH, said that Mr. MENELAUS had shown them in a few words how exceedingly desirable it was that they should now get out of the difficulty of a continuous change in the size of rails. One would have thought that the English engineers by this time must have arrived at something which would answer the purpose, instead of continually entailing a new cost and inconvenience on the lines which they represented, by adhering to minute distinctions in the size of the rails. There could be no practical advantage whatever to the companies they represented, but, on the contrary, there was an immense increase in the cost of production, and great annoyance to all the manufacturers. On a former occasion he had the pleasure, when speaking to a previous meeting of the Iron and Steel Institute, to express a wish that a universal system of rails should be introduced in this country, whereby—while, perhaps, there were three sizes, a small rail, a medium rail, and a large rail—the whole of the traffic could be well attended to. He hoped the remarks of MR. MENELAUS would leave an impression upon the engineers, and show them that the manufacturers still labored under a difficulty which might be easily removed.

*Abstract of a paper read before the Glasgow meeting of the Iron and Steel Institute.

Pure Wrought-Iron.

It has hitherto been deemed impossible to make pure wrought-iron: this has been done at the Bowling Ironworks, Bradford, from Bowling No. 2 pig iron, by the Henderson process.

The analysis of the pig iron used is:—

Graphitic Carbon	3.155
Combined do	.581
Silicon	1·646
Sulphur	.070
Phosphorus	.635
Manganese	1.472
Iron	92.644
	100.203

The wrought-iron from the above analysis:—

Carbon	.272 per cent.
Silicon	None
Sulpnur	The barest trace.
Phosphorus	None.
Manganese	None.
Iron by direct determination	99.500
	99.772

This is the purest iron ever made on a commercial scale of manufacture.—*Mechanics' Magazine.*

Protection Against Fire-Damp.

A French inventor, M. TURQUAN, is reported to have designed a means of preventing explosions of fire-damp in mines, or at least to obviate loss of life therefrom, by the simple agency of an alarum that gives warning when the emission of carburetted hyrogen has rendered the air explosive. The apparatus consists of an ordinary alarum actuated by a spring and clockwork, of which the balance-wheel is held in check by a lever to which a cord of cotton impregnated with saltpetre is attached, enclosed in the wire gauze casing of a safety lamp. The action is simple and obvious: when the mixture of gas and air has attained the explosive limit, it inflames within the lamp, and consumes the cotton, releasing the lever and balance-wheel, and setting the alarum in operation. Thus the miners have timely warning to withdraw until the air is purified by ventilation.

New Metallic Alloy for Cooking Utensils.

It is well known that all alloys containing copper, even in minute proportions, are readily acted on by acids, which makes them dangerous when used for household utensils. H. Helouis has proposed an alloy, under the name of platinum-bronze, which is entirely inoxidisable. It is a nickel alloy, prepared from nickel made thoroughly pure by various processes and maceration in concentrated nitric acid. The proportions employed are nickel 100, tin 10, and platinum 1; the two latter metals being added to the fused nickel in the proportion of 4 of tin to 1 of platinum, and the remaining 6 parts of tin added subsequently. For bells and sonorous articles, the proportions are slightly varied, viz., nickel 100, tin 20, silver 2, and platinum 1.

Rolled Railroad Axles.

At the shops of the London and Northwestern Railway, at Crewe, steel axles are rolled in rolls having grooves of varying depth, by which the necessary variation in diameter is given. Axles of any length can be rolled, and with collars at any part. This method not only saves time and produces an axle of superior finish, but also, it is said, prevents the flaws which occasion so many accidents to trains.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
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The English coal-miners appear to be overdoing their system of lessening work as fast as wages rise. They do not make as much as they did under the more generous method. A South Staffordshire magistrate says, that after consulting the best authorities he finds that although wages are nearly thirty-five per cent. higher than they were before, the amount of money paid the miners in that district is really £70,000 to £80,000 less, each week than before the rise. The miners must have an exalted notion of the principle of little work when they adhere to it at such a cost to themselves.

The Dubuque Meeting.

THE American Association for the Advancement of Science has had its annual meeting at Dubuque, Iowa. In one respect it fell behind its usual success. Dubuque is an out-of-the-way place to most of the members. Professional men are usually able to afford the time necessary for holding the meeting, and are willing to give both the time and labor necessary for the preparation of papers; but few of them are able to add to this necessary amount of time several days for travel to the place of meeting. The selection of Dubuque compelled a good many to stay away, for a Massachusetts or New York man must spend a week in travelling to and from that town, and as the number of scientific men is much greater in the east than in the west, this drawback operated seriously against the gathering of a great number of members. It is true the west has what may be considered more than its share of scientific students, considered in proportion to the population. Its numerous colleges are filled with active and able men, but the great preponderance of population in the east is much more than enough to overbalance their larger proportion of professional men.

Still, if the country is unable to support, at present, the large sectional associations which will undoubtedly one day be formed, it is better that the annual meeting should occasionally suffer some diminution of personal strength, rather than deny to the western men the advantage of having the association sometimes among them. They have proved this year their ability to sustain the meeting and if it is not pleasant to miss the faces of familiar leaders in science, it would be a matter of much more serious import to constantly subject so large and diligent a body of students, as the west can boast of, to the inconveniences which the eastern men suffer only occasionally.

The effect of meeting at so distant a point was seen in a decided reduction in the number of papers read. In the geological section, usually crowded with aspirants, for there is nothing to which the American mind seems to take more kindly than geology and oratory, a combination which in years past has heaped a mountain of talk upon Section B, the number of papers was so much smaller than usual that the Section actually got through its business without its usual snubbing of aspirants. The loss was more severely felt in Section A, of mathematics, physics and chemistry, which is not often too full.

Among the papers, one on the great coal field of Indiana by Professor ANDREWS, was thorough and speculative, and woke up a good discussion; Professor MORSE of Cambridge gave the Dubuque people a taste of his powers as a lecturer, and his wonderful facility with the chalk, in a lecture on the Locomotion of Animals. Professor HARTSHORNE of Pennsylvania, had an interesting paper on the relation between organic vigor and sex, in which he espoused the cause of the hitherto oppressed female, asserting that the production of males or females is the evidence of waning or increasing vitality. Dr. FOSTER of Chicago described some bird-shaped human skulls, of so peculiar a form that he has had difficulty in making scientific men believe that they are not pressed out of shape. They were taken from mounds in the West.

But it would be impossible here to give more than an uninstructive list of the papers that attracted attention. The meeting was not without the usual evidences of belligerency, and more than one spicy, though well restrained, debate attested that an assembly of bright intellects was gathered. Several excursions, which were fully attended, formed part of the proceedings. The officers elected for next year are Prof. Joseph LOVERING of Harvard University, President; Prof. A. H. WORTHEN, State Geologist of Illinois, Vice-President; Prof. F. W. PUTNAM of Salem, Mass., Permanent Secretary; Prof. C. A. WHITE, General Secretary, and W. S. VAUX of Philadelphia, Treasurer. Portland, Maine, has been chosen as the place of meeting next year, a selection which is as bad for Western men as Dubuque for the Eastern members. Of course there are strong reasons why the Association should visit every part of the country, but it appears to us that the middle ground between New York and the Mississippi will eventually become the tramping ground of the Association. There are cities enough there to receive it, a varied tract of country and a busy population to afford objects of useful study in its excursions.

The Tunnel Section.

We have already expressed our regret that the new United States Mining Law contains a section on the subject of prospecting tunnels, calculated to work injustice, inconvenience and mischief. Our opinion on this point is corroborated by the tidings we receive from all quarters, and particularly from Colorado, where the tunnel-business has heretofore found its warmest advocates. It is evident that this one provision of the new law, unless modified, repealed, construed away or overruled by public indignation, will undo the benefit which would otherwise be derived by the mining industry from the many other excellent reforms introduced by the same Statute.

The section in question provides, that where a tunnel is run for the development of a vein or lode, or for the discovery of mines, the owner of such tunnel shall have the right of possession of all veins or lodes within three thousand feet from the face of such tunnel on the line thereof, not previously known to exist, discovered in such tunnel, to the same extent as if discovered from the surface; and locations on the line of such tunnel, of veins or lodes not appearing on the surface, made by other parties after the commencement of the tunnel, and while the same is being prosecuted with reasonable diligence, shall be invalid; but failure to prosecute the work on the tunnel for six months shall be considered as an abandonment of the right to all undiscovered veins on the line of said tunnel.

The Commissioner of the General Land Office has declared that the effect of this section is simply to give the proprietors of a mining tunnel, run in good faith, the possessory right to fifteen hundred feet of any blind lodes cut, discovered, or intersected by such tunnel, which were not previously known to exist within three thousand feet from the face or point of commencement of such tunnel, and to prohibit other parties from prospecting for and making locations of lodes on the line thereof, and within said distance of three thousand feet, unless such lodes appear upon the surface, or were previously known to exist.

The Commissioner's construction disagrees with the text of the law in one important point. The law says the tunnel owner shall have "all veins or lodes * * * not previously known to exist;" the Commissioner says "*blind* lodes" only. But both agree in prohibiting prospecting within the limits of the tunnel claim (something over 100 acres) for lodes "not appearing on the surface."

Every miner knows that this practically stops all prospecting. If lodes as a usual thing appeared on the surface, there would be little art or labor in finding them. It is dirt, gravel, float-quartz, barren rock in fragments or ledges, that appear on the surface, and hide the outcrops, in most cases, of the best lodes. Practically speaking, therefore, no lodes can be found on a mountain at the base of which tunnels are located, so long as those locations hold good. If the mountain is so large that the tunnels at the bottom, with their long prophetic arms of 3000 feet, cannot grasp the whole of it, then a new set, put in above, will complete the business.

But the tunnels must be prosecuted with "reasonable diligence." Well, what is that? The law defines ten dollars' work per annum to be reasonable diligence for a claim of 100 feet on the surface. According to that, $150 per annum would do for a tunnel, which is to take 1500 feet. This section itself defines what is *not* reasonable diligence, namely, failure to work for six months.

Let us suppose that courts and juries, anxious to protect the prospector, and encourage the development of the country, really exact a diligent prosecution of work from every tunnel-owner. What would that amount to? Take, for instance, the Marshall tunnel near Georgetown, Colorado. Gen. MARSHALL has shown at least twice as much energy, pluck and perseverance as could be fairly demanded of an ordinary man; the difficulties which he has encountered and overcome, both physical and financial, are just

such as will beset all other tunnel enterprises; yet after years of labor, his tunnel has penetrated only about 1300 feet. It is safe to say that, under this law, a tunnel might be from ten to fifteen years in reaching a length of 3000 feet, without any such lapse of diligence as would fairly forfeit its claim. This is on the hypothesis that juries and judges would not be influenced to favor the tunnel unfairly, by overlooking occasional negligence and delay. If the tunnel-claims should be treated as leniently as the ordinary surface-locations have been, (which Heaven forbid!) we do not see why they might not take a century to reach their full length. All that time, be it long or short, prospecting is prohibited.

The immediate result of this legislation has been, that in all the new districts, after the first discovery of a vein, there is a rush, not to find more veins, but to locate tunnels, and so prëempt, for an indefinite period, the chances of discovery. Of course, a dozen tunnels can monopolize in this way the ground which hundreds of eager prospectors would otherwise be employed in ransacking. The wrath of the miners at this sudden interference with their customs and rights is very great; and the law *must be altered.* If no other change is made, time should at least be given for thorough surface-prospecting, before the tunneller is allowed to come and bar the door.

But there are many other faults and ambiguities in this provision. We have only space at present to speak of one. In spite of the outrageous favor shown to the tunnel-owner, no way is provided for him to get any thing more than a possessory title. While he works with reasonable diligence, he holds his rights. When his tunnel is done, he cannot "prosecute" *that* any further; and, for all we can see, he must fall back on his possessory right to the lodes cut, which requires that he shall do so much per hundred feet every year to hold them. Apparently the government pledges itself never to give him any permanent title. It protects him while he stands in the way of other miners, but it gives him no chance to work his own mines to the best advantage. If this curiously blundering arrangement continues, it will put an end to the sale of mineral lands by patents, except in those fortunate districts where "the veins or lodes appear on the surface or are already known to exist."

This tunnel provision was engrafted upon the law, according to popular rumor, at the request of "citizens of Colorado." We opine that the citizens of Colorado will be thoroughly cured by its workings of their ridiculous and superstitious *penchant* for multiplying tunnels. Gen. MARSHALL, to whom we have already alluded, has been too wise to put himself in such hostility towards the prospectors and surface-owners as this provision contemplates. By judgment and good nature, he has saved himself so far from serious strife. But not everybody is like him; and there will be a crop of quarreling and litigation over this tunnel question, we greatly fear, out of which the undertakers and the lawyers only will get rich.

The American Institute.

The season of exhibitions is at hand and we hear of "openings" in all parts of the country. What is more, the colossal scale upon which some of them are organized and the numbers that visit them are proof that they have their usefulness, and a very great one it is. When we consider for a moment the number of these gatherings in towns, counties and States, during the year; the vast amount of money spent by exhibitors and visitors; the very considerable sums given in prizes, and the steady growth of all these evidences of prosperity, from year to year, we may comprehend the importance of the Fair and the Exhibition to a community so given to "getting the best" in manufactures and produce, as our own. The ever recurring necessity of providing to meet the competition of rivals must be a serious tax upon makers of machines, and we occasionally hear complaints from them. But on the whole it is better. The people pay for it in the end, besides paying to see the rivalry, and if the people are satisfied to pay, the manufacturers ought to be willing to bear the worry.

The wonderful extent and number of these exhibitions has brought many minds to a deeper study of the subject than that found in the ordinary reports of the periodical press, and the deliverer of many an opening address has this year had a word to say of that time when the world was without the Exhibition because man then lacked the intimate dependence upon machines, and the absorbing hope of bettering the products of his labor. There was a time when invention was so rare that the inventor, coming once in a century or two, was honored as a hero, or exalted as a god. Now the faculty is so common that the generic condition of the inventor is commonly supposed to be unmitigated seediness.

Of all the annual collections made in this country, that of the American Institute, both as one of the oldest, and as connected with the greatest city of the Union, commands especial importance. Its opening on Wednesday last was graced by an address from Dr. BARNARD, a scientific man, who combines in a fortunate manner the profundity of the true student with a practical appreciation of business necessities. He, too, referred to the striking differences between the present course and the past history of the world, justly saying that the rude productions of the Arab and the Indian show a less inferiority to the products of the civilized races, than the manufactures of the same civilized races only a few centuries ago, to those which our marvellous machinery now turns out so easily. He pointed to the extraordinary multiplication of industries and of helps to industry, which is going on as *the* characteristic of the age, and estimated, within safe boundaries we think, that the production of manufacturing industry has more than doubled since the institute was founded, in 1830, and has increased tenfold since the Declaration of our Independence. It is next to impossible for a man brought up amid all these helps to civilization to comprehend the condition of life among his ancestors of two hundred years ago. Mr. DARWIN could go back to his original apishness with as much comfort as a machine-nursed American could accept the luckless condition of that age.

It was natural, and proper too, that, standing amid so many evidences of American power, the speaker should point with pride to the share we have had in making this great advance. He said:

"The cotton-gin, without which the machine-spinner and the power-loom would be helpless, is American. The power-shuttle, which permits an unlimited enlargement of the breadth of the web, is American. The planing-machine is American. Navigation by steam is American. The mower and reaper are American. The rotary printing-presses are American. The hot-air engine is American. The sewing-machine is American. The machine manufacture of wool cards is American. The whole india-rubber industry is American. The band-saw originated, I believe, in America. The machine manufacture of horseshoes is American. The sand blast, of which the large capabilities are yet to be developed, is American. The gauge lathe is American. The only successful composing-machine for printers is American. The grain elevator is American. The artificial manufacture of ice, which you saw exhibited here two years ago under the name of the Carré process, was originally invented by Prof. ALEXANDER S. TWINING, an American."

He could not omit from his address a reference to the astounding course of Congress in regard to the Vienna Exposition. We have seen one paper which applauds the action of that body on the ground that American manufactures are so much higher than foreign that it is hopeless to try to compete with them. That was equally true of the Exposition in Paris in 1867, where more than half of the American exhibitors took prizes. But who can say that no direct pecuniary advantage, as well as very great consequential benefits, sprang from our efforts there?

The Fair of the Institute is now open. Much remains to be done, for a press of entries has compelled the managers to make additions to their room, and there is still confusion. But we are promised completeness, or at least comparative readiness by Monday, and then the work of the Institute will fairly begin.

EDITORIAL CORRESPONDENCE.

The Big Outcrop of Parley's Park.

SALT LAKE CITY, Aug. 19, 1872.

I have made a trip to Parley's Park, to see the monumental outcrop of the nineteenth century, the newest sensation of this most sensational camp, in short, the McHenry ledge, concerning which the Associated Press has been telegraphically eloquent, and the Gentile world of Utah has been by turns insanely enthusiastic and dismally cynical. One naturally grows a little *blasé* after many years of enforced practice in looking at wonderful, inexhaustible, incalculably rich deposits; and if I do not gush as abundantly over this one as might be expected, it is perhaps because the fountains of youthful admiration are beginning to run dry. Certainly the McHenry mine promises to be a most valuable one, as you shall hear.

The route to Parley's Park from Salt Lake City follows for a considerable way the old overland stage road, passing Camp Douglass in the distance, and winding through the picturesque Parley's cañon. The Park itself is a small, nearly level plain, surrounded on all sides by the mountains, and the principal mines are near its southern end—on the west, near the summits in which head the famous Cottonwood cañons over the range, are the Flagstaff (not the Cottonwood Flagstaff, but an emulous namesake) Walker and Webster, and Piñon—all in limestone. More nearly south of the Park, on a mountain which, being much covered with boulders, soil and pine timber, has heretofore been avoided by prospectors, is the McHenry, with its extension each way, and beyond these, on the northeast, the Boulder, and on the southwest, a second extension, the Clara, the Wasatch, and the Red, White and Blue, all of which are vehemently declared to be daughters in true lineal connection of the same mother lode, to wit, the McHenry aforesaid. From the McHenry mine to Salt Lake it is 29 miles; and the road near the mine is abominably steep and difficult. But to Echo City on the U. P. R. R., it is only 24 miles via the Provo valley, and a new narrow-gauge railroad said to be constructing from Echo to Heber City by the Mormons, would pass the foot of the mountain, about three miles from the mine.

The mountain is quartzite and granite, mostly hidden from sight by the superincumbent earth and vegetation. Boulders are plenty, and in the small steep cañon on the west they have been carried down for a considerable distance. It was in this cañon that the rich float rock was found which led, after much laborious prospecting to the discovery of the ledge. Not that it was so very hard to see; the discoverer sat on it a dozen times to wonder where it was, never suspecting that the large rock-mass beneath him was the outcrop of a vein.

This outcrop consists of a cliff, about ninety feet high, two hundred and fifty feet long, and perhaps fifteen feet wide on the top, from the edge to the line where it disappears under soil, roots and boulders. This cliff is believed to be, with the exception of a sheathing of quartzite, which adheres in places to the face, entirely composed of silver-bearing quartz. The evidence consists of numerous assays of samples chipped from all accessible points. The average of sixty-five assays is said to have been a little over $200 per ton, the minimum being $22. Some assays have yielded less; but these are declared to have been made upon samples of the quartzite, outside of the vein. Perhaps fifty tons have been blasted from one corner of the mass, and form the beginning of a

dump. A dump, you must understand, is the correct thing for a mine to possess in this quarter of the world; and though there is no talk at present of selling the McHenry, yet if it should hereafter be put on the market, doubtless it would need a dump. As the rock above ground amounts to 16,000 tons, it will be seen that the formation of a dump is an easy matter. So far as the excavation has gone, it shows the mass of quartz to be more or less charged with "mineral" in bluish and black spots, and ochreous or light yellow stains, as well as copper stains. It looks like a fair milling ore, and an experiment tried with 75 pounds in San Francisco is said to have proved it to yield its silver readily by raw amalgamation.

It is impossible to say at present with positive certainty what is the form of the deposit. At first it was naturally believed to be an immense boulder; but the discovery of more or less ore in the located extensions gives ground for believing that it is really an outcrop in place; and the question then arises as to the true dip and real width of the deposit. Its course is N. E. and S. W. If it dips S. E., that is, into the mountain, then the ninety feet of vertical exposure represents an oblique section across a vein of say sixty-five feet thickness. If it dips steeply N. W., that is, with the hillside, then the cliff is a portion of a vein, say twelve feet thick, and stripped on the hanging wall. In the former case, the assays taken all over the surface might be presumed to represent the character of the vein throughout its whole sectional area. In the latter case, the larger number of the assays would represent the character of a zone along the hanging wall. There are both arguments and indications in favor of the supposition that the ledge is intercalated between layers of quartzite, and dips into the mountain. A tunnel now constructing, about 150 feet below the topmost outcrop, will probably decide the questions of form, thickness and value. It has already, at 90 feet from the tunnel-mouth, struck hard bluish quartzite, dipping S. E., about 30 degrees, and it is expected within the next 90 feet to cut the vein.

The McHenry is owned by Messrs. WHITAKER and TEMPLETON. The former, Mr. JAMES K. WHITAKER, is a New Yorker, well known to the members of the Union Club. It is popularly reported that he and his partner paid a handsome sum—say one hundred thousand or two hundred thousand dollars—for the property; but they keep their own counsel, and nobody really knows the terms of the purchase except the parties immediately concerned. At present, they are engaged in developing the nature and value of the mine. If it sustains the high anticipations inspired by its superficial appearance, they will probably erect a stamp mill of large capacity, and commence extensive operations. It is understood that heavy sums have been offered for the mine as it stands; but every lucky mine-owner in Utah wants a million or nothing; and these gentlemen have faith enough in their property to believe it will improve upon acquaintance, and be worth more when developed than in its present vaguely vast and imposing uncertainty.

R. W. R.

Notes From Georgetown.

II.

Poor Georgetown has had a hard road to travel from the time that so many mills were burned down to within a month ago, when Mr. STEWART commenced working again. Whoever knows how directly the stoppage of the mills in a camp affects every other business, can imagine with what intense longing everybody in Georgetown looked towards the time, when the dark smoke would again issue from the tall stack of the principal mill. There were only the old rickety mill, which Messrs. PALMER and NICHOLS have leased, and the small one of Mr. DIBBENS, at Argentine, to work the second-class ores from probably 100 mines, which kept on delivering their ore. Of course these mills could work but a very small portion; and the rest, as it could not be shipped to advantage, had to remain on the dump. I have already in my former letter given the contents of ore required by the ore-buyers for shipment. Such high grade ore was of course sold and sent away; but the first-class ore of a mine can in but few cases support its prosperity. Even now, that Mr. STEWART has commenced running his mill again, brings no substantial relief to the miners; for Mr. STEWART has ore for several months ahead and of course does not wish to buy new supplies, before he has made some inroads into his old ones. But the time is now at least nearer when the old dumps may again be emptied, and by the first of September the new mill of Messrs. JUDD & CROSBY is also expected to step in to help clearing away ore-piles. Meanwhile business has become quite lively with the prospects of the near future, and since four sampling works have bought first-class ore as fast as it could be delivered. Of these that of Messrs. MARSHALL and MARTINE is undoubtedly doing the heaviest business. It ships two car loads, or 22 tons per week. The others are those of Mr. AIREY, the Lebanon Co., (Dr. POHLE) and Mr. SNYDER, the latter being situated some two miles above town, a short distance below the little village of Silver Plume. New sampling works are now in the course of construction a little lower on the creek than the old works at this place.

Mr. STEWART'S new mill, as it has risen from the ashes, is certainly a very good mill. The Airey furnace, with which so much difficulty was experienced before the fire, works now much better and chloridizes the heavy blendic ores, worked here, up to an average of 85 per cent. But there are still large fluctuations in the degrees of chloridation, and it is not too much to say, that they keep between 70 and 94 per cent. The difficulty in the draft, on account of the abutting directly against each other of the current from the lower and that from the upper fireplace, has been overcome by an enlargement of the horizontal flue, which leads to the stack, and it is only while the lower fire-place is being filled with wood and the door is open, causing a great rush of air at that place, that the draft of the upper fires is stopped. The dust escapes into the chambers very poorly chloridized, not over 75 per cent., and must be run over again. On the whole, it will be seen, the Airey furnace does not yet come up in its results to that of Mr. STETEFELDT; and from a theoretical point of view it will not do so, as long as the ore is exposed to the highest heat immediately after it enters the furnace. The arrangement of Mr. STEWART'S new mill is not much different from that of last year before the fire, only that now the waste gases from the furnace are conducted from the condensation chambers to the drying-floor above the stamps and thence back to the stack, which stands between the furnace and the stamps, and a little to one side of a line between the two. The crushing and amalgamation department of the mill have the same general arrangement as those of a first-class Nevada dry-crushing silver mill. From the ore floor the ore passes through two BLAKE'S crushers and is spread on the drying-floor below. Next it passes through the 20 stamps, which are so arranged, that different ore can be crushed in each battery, (of 5 stamps) and a sample for assay can be got by a very simple arrangement before the ore from the different batteries is mixed in the horizontal conveying trough through which the ore passes, dragged along by means of an endless chain with disks attached every foot, to a receptacle at the foot of the furnace. From here it is raised to the top of the furnace by an elevator. The arrangement for sampling above spoken of is simply two very narrow and short slits, which are cut into the housings of each battery immediately in front of the screw, so that a small portion of the crushed ore, forced through at each stroke of the stamp, is thrown through these slits and caught in a receptacle below. From the cooling floor of the furnace, which is on a level with the amalgamating floor, the ore is conveyed into Varney pans, thence into settlers and finally the tailings pass through long troughs, in which the heaviest ore is caught. These concentrated tailings assay $60, and the portion finally passing off into the creek only from 3 to 5 ounces in silver.

Mr. STEWART experiences much difficulty on account of the different grades of ore brought to his mill. The ores, for instance, which contain a large percentage of blende must be passed through the furnace at less than half the speed, or rather in less than half the quantity for a given time, than quartzoze silver ores with little blende; and the whole running of the mill is dependant on this. Thus, while the capacity of the mill is really from 20 to 24 tons per 24 hours, only 10 or 12 tons can be worked up, when "heavy" ores are treated. This difficulty Mr. STEWART thinks he will be able to avoid by subjecting the blendic ores to a preparatory roasting in a terraced reverberatory, which he is now building. He thinks that by roasting these ores in the reverberatory up to sulphates, he can pass the latter through the Airey furnace as fast as "light ores," and chloridize all of his ores to a more uniform and higher perecentage, than is done at present.

The mill of Messrs. JUDD & CROSBY is now in the course of construction. It is situated just above the town on the left branch of South Clear Creek, and arranged in 5 terraces. Mr. CROSBY is introducing here an invention of his own in the way of a roasting furnace. It is a combination of an inclined reverberatory, through which the ore passes first, being meanwhile stirred continually by means of machinery, and in which an oxydizing roasting is intended to be carried on, with a stack, through which the ore subsequently passes together with salt introduced at its top. In the latter, the chloridizing is to take place. There are to be 10 stamps and Varney pans in this mill. The machinery is all brought here from California. The mill is expected to start working about September first. After that it will be easier to form a judgment about its merits. That it is very conveniently arranged, as regards the economical handling of the ore, must be acknowledged; and if the new furnace comes up to the expectations entertained about it by the inventor, the mill will be another and a very welcome means for the Georgetown miners, of divesting themselves of their abundance of second-class ores.

At the fork of South Cleark Creek and the branch coming down from Empire, some three or four miles below Georgetown, an English Company have bought and partially rebuilt Cullom's smelting works. They intend to use the auriferous iron pyrites from Empire to gather the silver from Georgetown ores in an iron matte. Up to the present these works have not worked regularly, the repeated breaking down of the arch in the reverberatory smelting furnace being given as the cause.

DENVER, Aug. 14, 1872. A. EILERS.

MINING SUMMARY.

Nevada.

WHITE PINE.

(From our special correspondent.)

TREASURE CITY, Aug. 14th, 1872.

Thinking that a few mining items from this district might be of interest I take the liberty of enclosing the following:

SOUTH AURORA.—Prospecting is being carried on in this mine by boring with diamond drills. The greatest depth yet reached is 330-340 feet below the Satterthwait tunnel or 540 feet from the surface. The original intention was to explore the ground to a depth of 1000 feet from the surface by boring a number of holes along the supposed line of the deposit, should one exist at a greater depth. But owing to accidents such as choking the drills, breaking the rods &c., the venture is not likely to prove very successful, and the probability is that the work could have been done as cheaply and much better by the old method of exploring by means of shafts and drifts. Nothing of importance has yet been found. The formation so far bored through does not differ materially from that found near the surface, i.e., limestone alternating with layers of calc spar.

ORIGINAL HIDDEN TREASURE.—The Wheeler tunnel, projected to strike this mine something over 500 fee

below the croppings, is now in 350 feet; some indications of ore have been met with, samples taken from a spar seam, lately struck, assay from $5 to $10 per ton, but there is not much probability of ore in any quantity being encountered much short of 100 feet further.

EBERHARDT MINE.—A horse whim has been erected on this mine for the purpose of sinking the old Blue Bell shaft to a depth of 500 feet from the surface. The present depth is 184 feet.

NORTH AURORA.—Work has been carried on from both ends of this location for nearly one year. The ladies' chamber on the north has been carried south some 450 feet, and the De Pass chamber has been carried north from the boundary line of the South Aurora, until only about 180 feet of unprospected ground remains between the two chambers. This deposit is somewhat remarkable on account of its great length north and south and the large quantity of ore it has already yielded. Should it continue through the small strip of still unexplored ground its whole continuous length will not be much less than 1,800 feet, while the ore extracted to date amounts to 65,000 tons, worth on an average $40 per ton, or $2,600,000 gross. The greatest depth yet attained in ore is 155 feet from the surface.

The prospects for the future of this district are not very encouraging. Some of the companies are prospecting for deeper deposits, and upon their success depends in a great measure the future prosperity of the district. For disguise the fact as much as we please, the surface deposits are being gradually exhausted of all the pay-ore, so that in less than one year, if no new deposits are discovered, the district will cease to be bullion producing. But I think there is no reason for despondency, for a locality that has yielded more than $7,000,000 from its surface deposits will be likely to furnish something deeper.

ROBINSON DISTRICT

Is situated 45 miles east of White Pine. Mineral was discovered and a district organized some time in 1868; but the ores were of that class known as base and no attempt was made to utilize them until the summer of 1869 when a furnace was erected by some San Francisco capitalists, but the venture proved a failure and the district was subsequently nearly abandoned for a time. Early in the present summer the property was purchased by the Canton Company, an eastern incorporation, and a strong effort is being made to revive the mining interest of the district, but apparently with rather poor success. The ore appears to be unusually rich in both gold and silver and the percentage of lead is quite high, three tons of ore are said to produce one ton of bullion worth from $300 to $900 per ton in gold and silver. The value of the gold contained in the bullion is a litt'e in excess of the silver. The ores are evidently superior to those of Eureka, but more difficult of reduction. Several samples of lead ores that I have examined were composed wholly of cerusite and leadhillite containing considerable iron oxide (hematite and limonite.) The prevailing gangue appears to be calcareous; occasionally fluorspar is found. Silicious ores are scarce. The district contains some fine ledges or deposits of copper ore (black and red oxide and blue and green carbonate.) B.

THE YELLOW JACKET FIRE.

The *Mining and Scientific Press* of Aug. 17 says:

It will be remembered that a few months since quite a discussion was carried on among some of the papers on this coast, as to the origin and cause of the fire in the Yellow Jacket mine, some three years since, by which a large amount of property was destroyed, and a number of valuable lives lost. Serious charges were brought against a certain gentleman prominently connected with the mining industry, and great interest was manifested by the public in the subject. The names of several well-known people were connected with the affair and although it was supposed by many, that the vague rumors which were set afloat at the time of the fire, were being revived from personal, political and speculative motives, it was, nevertheless, considered worthy of investigation by the Grand Jury of Storey County. That body after a complete investigation, have failed to gather any facts which would show that the fire was caused by the act of any person known to any of the witnesses. One witness in particular, who claimed to have information which would tend to show that the mines were purposely set on fire, was carefully examined, and the verdict of the jury is "that we are convinced that his statements are without foundation, and unsustained by any other witnesses, and seemingly the result of personal malice towards parties by whom he conceived himself to have been maltreated."

As to the matter of unusual quantities of powder having been taken into the mine just previous to the fire, the testimony failed to prove that any more powder was put there at any time than was necessary for daily working of the mines. It is to be hoped that this decision will set the matter at rest forever, and that we will have no recurrence of charges and countercharges, which, to say the least, are insults to the judgment and morality of the people of this coast; since if there were any truth in the assertions, they should be immediately made the subject of judicial investigation, and the community would not rest until the parties who committed so foul an act as to sacrifice a number of fellow beings, merely to gain certain financial points, were disposed of in a very summary manner. The possibility that such persons would be allowed to go free because of their wealth or social position, only aggravates the insult. We hope never to hear anything more of the affair.

California.

The San Francisco *Bulletin* of August 23d has the following budget of mining items.

BUTTE COUNTY.

The *Record* of the 17th says of the mammoth Silver lead: "It is a fine, well-developed ledge, from six to ten feet wide, and can be traced for several miles. The Golden Summit Silver Mining Company, the discoverers of the ledge, are pushing work forward; they are sinking a shaft and taking out some fine-looking ore, which they intend to send to San Francisco to be worked. The Belmont, the first extension north, are striking ore at the depth of four feet. The Dexter, the second extension north, are sinking a shaft and taking out some very rich ore. The Dutch Company, on the first extension south, are making preparations to go to work sinking a shaft. There are seven other companies here whose names I do not know. The discoverers of the silver ledge have also a decomposed gold-bearing quartz ledge, which they work with a common Chinese hand-rocker, and taking out from one to five ounces per day. These ledges are about five miles distant from the famous Gravel Range Mining District.

CALAVERAS.

The *Chronicle* of the 17th has the following: The lead in the San Bruno mine has been struck in the lower tunnel, after running a distance of 250 feet. The ledge shows splendidly where the drift cuts it, being fully three feet in width and composed of first grade ore. It was not expected that the vein would be reached before the tunnel had been driven a distance of 500 feet; and it is still possible that the ledge which the drift cuts is not the one worked in the shaft above.

From the Gwin mine we have further intelligence of the most flattering character. Extraordinary rich rock has been struck in the south shaft, below the 500-foot level. A contract has been let to sink the shaft 100 feet deeper, making 600 in all. Messrs. Howard, Rielly and others are the contractors. But a short distance has been sunk as yet, but the ledge has come in nearly three feet thick, and we are told the rock is the richest ever taken from the mine. Work on the central shaft is also progressing finely. The batteries are kept in constant motion with good results, and the general prospects of the mine are excellent.

EL DORADO COUNTY.

The *Republican*, of August 15th, speaks of one of its mines as follows: The Granite claim was purchased last spring by I. I. Holmes, and a tunnel commenced for the purpose of testing it. A few days since the point started for was reached, and the result was highly satisfactory. This claim lies on what is called the Deep Channel or Blue Gravel Channel. It is the same channel in which Robinson is constantly taking out piles of gold, and adjoins the Creighton claim, out of which over a million dollars have already been taken. One edge of the Granite has been worked heretofore, and over $40,000 taken therefrom. Holmes has incorporated it, and is now negotiating for the erection of a ten stamp mill.

The *Mountain Democrat* of the 17th says, very rich ore has been struck in the Gray mine, situated in Gray's Flat, White Oak Township. They are now putting up a ten-stamp mill, which will be completed with all diligence, and commence crushing ore. They have already taken out quite a large amount of rock, one hundred tons of which is estimated by good judges to be worth $100 per ton. They are now down on the ledge 150 feet.

NAPA COUNTY.

The quicksilver mines in Pope Valley are doing well. At the Washington, a new lead has been struck, which is the richest yet discovered, and promises to be of great extent. The furnace now in operation is soon to be replaced by one of a larger and better pattern. Work will be pushed vigorously ahead. With the small furnace now in operation, and the few men employed, the mine is yielding an average of a flask per day.

NEVADA COUNTY.

The *Transcript* of the 17th says: North Bloomfield is now a lively mining camp. The North Bloomfield Company is employing a large number of men, on Wednesday the first of their eight or nine hoisting works, on the line of their tunnel, was started up at shaft No. 8. A new hotel has been recently opened for the accomodation of the men employed by the company. The hoisting works will be run by hurdy-gurdy wheels, and in the eight shafts, when opened, they will work the tunnel from sixteen faces. When their ground, amounting to nearly 1,500 acres and running some 2,000 feet upon a channel of great width from which they took out over $30,000 in prospecting by drifting, is opened, the company will have one one of the richest gravel mines in the country, and will be amply repaid for their large investment.

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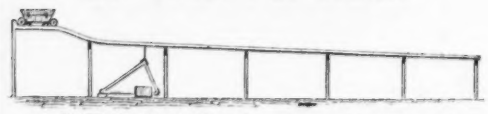

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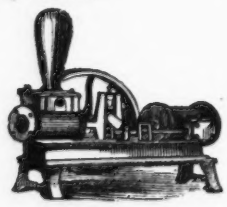

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40	40 45	1½	27 05	30	11 10	15	31 85
50	52 05	2	36 60	35	14 15	20	45 45
60	63 80	3	55 20	40	17 25	25	58 80
70	76 60	4	73 35	45	20 20	30	72 00
80	87 90	5	92 10	50	23 50	40	96 20
90	100 60	6	111 40	55	26 30	50	127 35
100	111 70	7	129 80	60	29 50	60	155 70
110	124 40	8	148 15	65	32 85	70	185 00
120	137 20	9	168 30	70	36 30	And so on.	
130	148 55	10	186 80	75	39 50		
140	161 10	11	205 30	80	42 85		
150	173 60	12	225 45	85	46 25		
175	205 10	13	244 10	And so on.			
200	234 45	14	263 30				
225	265 85	15	283 85				
250	297 35	20	379 90				
275	329 70	And so on.					
300	361 50						
350	424 20						
400	486 25						
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500	613 75						
And so on.							

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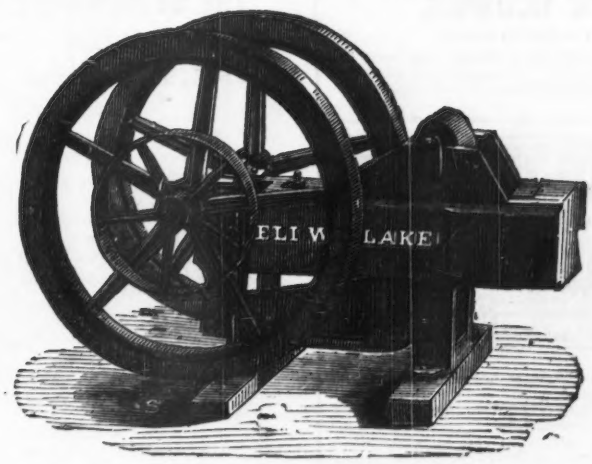

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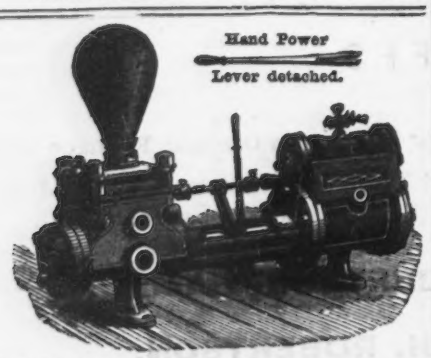

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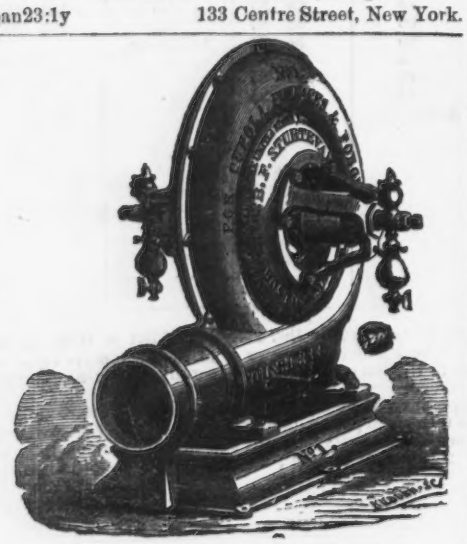

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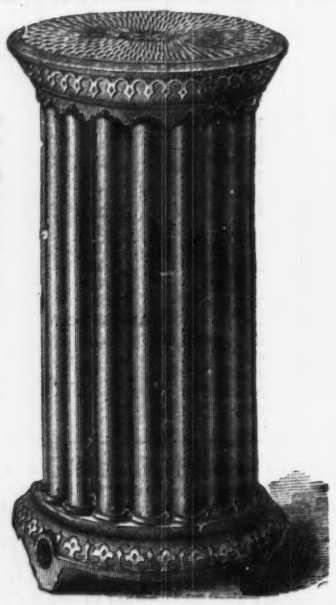

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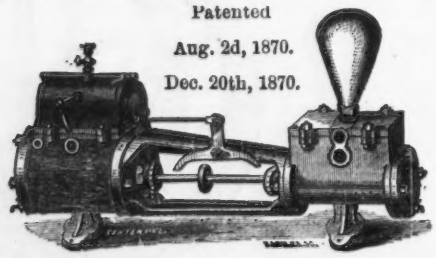

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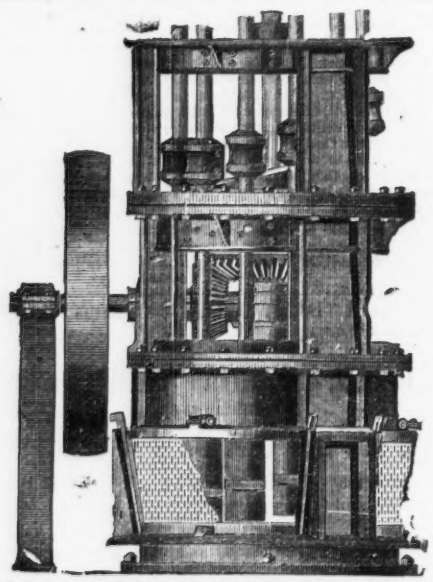

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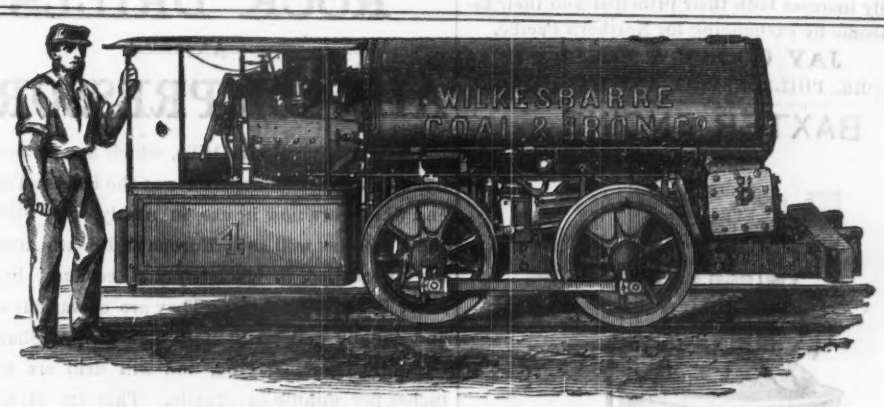

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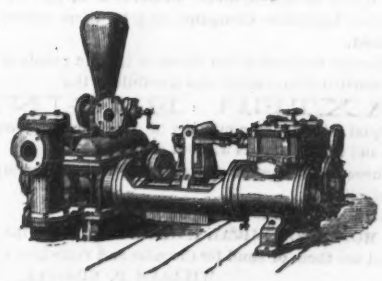

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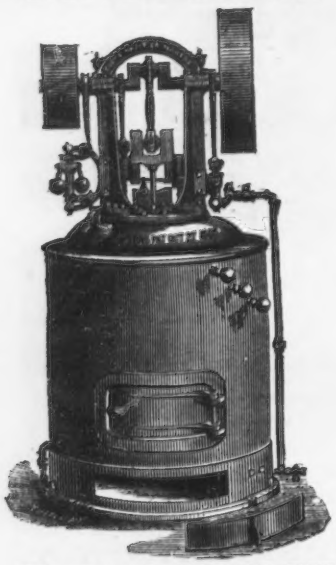

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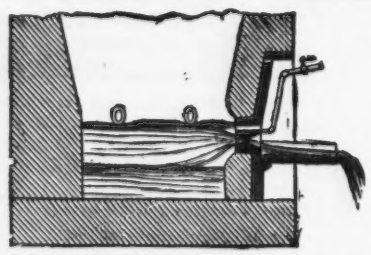

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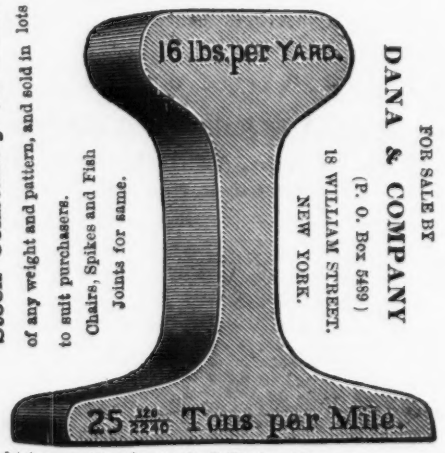

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